

**Appendix B.**  
**Final Literature Review**

---

**Evaluation Design for the Chronic Disease Self-Management Program  
Implemented in AoA Funded Settings**

**HHS290200710071T, Task Order No. 6**

**Task 2.1 Final Literature Review**

Revised February 22, 2011

***Submitted to:***

Agency for Healthcare Research and Quality  
U.S. Department of Health and Human Services

***Submitted by:***



10420 Little Patuxent Parkway, Suite 300  
Columbia, MD 21044

Phone: 443.367.0088 / Fax: 443.367.0477

[www.impagint.com](http://www.impagint.com)



## TABLE OF CONTENTS

<b>1. Background and Purpose.....</b>	<b>1</b>
<b>2. Literature Review Methodology .....</b>	<b>2</b>
<b>3. Evaluation Methods .....</b>	<b>4</b>
3.1 Design Types .....	4
3.2 Evaluation Methods - Summary of the Findings.....	7
<b>4. Outcomes Studied.....</b>	<b>8</b>
4.1 Health Behavior .....	8
4.2 Health Status.....	8
4.3 Health Care Utilization .....	8
4.4 Self-Efficacy.....	9
4.5 Other Outcomes.....	9
4.6 Outcomes - Summary of Findings .....	11
<b>5. Program Characteristics: Potential Predictors and Confounding Factors.....</b>	<b>11</b>
5.1 Population Targeted .....	11
5.2 Mode of Intervention.....	15
5.3 The Role of Funding Agencies in CDSMPs.....	15
5.4 Program Characteristics: Summary of Findings .....	18
<b>6. Summary and Implications for CDSMP Evaluation Design.....</b>	<b>19</b>
6.1 Design Implications.....	19
6.2 Outcomes of Interest .....	20
6.3 Program Characteristics to Consider .....	21
<b>References.....</b>	<b>22</b>
<b>Appendix A: Articles included in Review of the Literature Table .....</b>	<b>29</b>
<b>Appendix B: Data Extraction Tables .....</b>	<b>37</b>
<b>Appendix C: Additional Extraction Table .....</b>	<b>64</b>
<b>Appendix D: Stated Program Modifications .....</b>	<b>70</b>

## 1. Background and Purpose

Chronic Disease Self-Management Programs (CDSMPs) are designed to empower adults with chronic disorders to better self-manage their conditions and improve their physical and mental health. The best known and most thoroughly studied CDSMP was developed by Stanford University's Division of Family and Community Medicine in the School of Medicine with funding from the Agency for Healthcare Research and Quality (AHRQ) and the State of California Tobacco-Related Diseases office. The lay-led program emphasizes the individual's role in managing illness and building self-efficacy so he or she can be successful in adopting healthy behaviors. The Administration on Aging (AoA) funds the CDSMP and similar programs through grants to State Units on Aging and Public Health Departments who disburse funding to local public health departments in many states.

The Stanford University CDSMP is an evidence-based disease prevention model designed to help people with chronic diseases better self-manage their conditions, improve their health status, and reduce their need for more costly medical care. The program consists of two and a half hour workshops once a week for six weeks and is generally administered in community settings such as churches, libraries, YW/MCAs, senior centers, public housing projects, community health centers, and cooperative extension programs. The program is also available online. Because the program is not condition-specific, people with different chronic health problems attend together. The workshops are facilitated by two leaders, who are trained and certified by Stanford University, one or both of whom are non-health professionals or lay people with chronic diseases themselves. Workshop topics include: 1) appropriate exercise for maintaining and improving strength, flexibility, and endurance; 2) appropriate use of medications; 3) communicating effectively with health professionals; 4) nutrition; and 5) techniques to deal with problems such as frustration, fatigue, pain, and isolation.

Another well-known and researched CDSMP is the United Kingdom's Expert Patients Programme (EPP), which is based on the Stanford CDSMP model. The EPP is a central component of chronic disease management policy in the United Kingdom (Rogers, et al., 2008), and is expected to target over 100,000 people in England and Wales by 2012 (Richardson, et al., 2008). The EPP is also evidence-based and designed to help people with chronic disease self-manage their conditions, improve their health status, and reduce medical costs. Similar to Stanford's CDSMP, the EPP consists of six weekly workshops conducted in community settings, and is also available as an on-line tool. The topics discussed during the workshops are also similar to those presented in the CDSMP workshops.

In addition to the generic (i.e. non-specific disease) Stanford CDSMP and the British EPP, other disease-specific self-management programs, such as those that are home-based (Jerant, Moore-Hill, & Franks, 2009) or clinic-based (Johnson & Raterink, 2009), have been implemented and evaluated.

The purpose of the evaluation design that will be informed by this literature review is to examine the effectiveness of the Stanford University CDSMP as administered by the AoA at improving participant health status, health behaviors, and reducing healthcare utilization and costs. However, since the Stanford CDSMP is only one of a number of self-management programs, it seems prudent to review the literature more broadly by including evaluations conducted of other self-management programs.

To this end, the IMPAQ/Abt Team (a.k.a. design team) utilized reports from agencies and research organizations to guide a thorough review of the published self-management program literature. In particular, articles were collected and reviewed to gain insight into three primary aspects of evaluation:

- Methods to evaluate self-management programs;
- Key outcomes studied; and,
- Program characteristics, especially populations targeted by/included in evaluations.

The information extracted from the reviewed articles and summarized in this report is organized by key topics as listed above. The topics are presented by section with relevant findings summarized at the end of each section. Implications and preliminary design recommendations are presented in the final section of this report. The results of this literature review will be used in the development of evaluation design options that are feasible and allow an independent assessment of AoA-funded CDSMP outcomes while remaining relevant to results found in other similar studies. The report concludes with a list of findings for AoA to consider when working with the design team to finalize the evaluation design.

## **2. Literature Review Methodology**

To create guidelines for the CDSMP evaluation design, the design team worked collaboratively with AoA staff to define the key issues and research questions surrounding the evaluation of the CDSMP. Our initial efforts were guided by CDSMP evaluation reports completed in the last five years. We also searched evaluation reports of community-based long-term care programs that are similar to the CDSMP so that we could better understand potential methodological approaches, including the appropriateness of randomized control designs to evaluate the CDSMP.

The design team identified and analyzed literature using specific search criteria/parameters. The criteria/parameters for inclusion in the search included chronic disease, Stanford University chronic disease program, wellness intervention programs, falls prevention programs, diabetes self-management, arthritis self-management, CDSMP, and other related concepts. The primary sources of literature were PubMed/MEDLINE and EBSCOHost, but also include the reference list of the Centers for Disease Control (CDC) meta-analysis and other materials provided by AoA. The search strategy used the National Library of Medicine's Medical Subject Headings (MeSH) key word nomenclature developed for MEDLINE, and was adapted for use in the other databases. Text word searching was also used to supplement MeSH searching. All searches were limited to human subjects, publication dates between 2005– 2010, and English language publications (i.e., North American, Canadian British, and Australian). For the initial phase of literature searching, we began in EBSCOHost and PubMed to determine peer-reviewed articles employing the aforementioned keywords. Figure 1 depicts the peer-reviewed articles found strictly through an internet-based keyword search.

**Figure 1.**

<b>Search Terms</b>	<b>Host</b>	<b># Results*</b>
"chronic disease self management" AND behav* AND Stanford	EBSCO	7
chronic AND "self management" AND evaluat*	EBSCO	144
chronic AND "self management" AND evaluat* AND behav*	EBSCO	114
chronic AND "self management" AND evaluat* AND behav* AND intervention	EBSCO	58
"chronic disease self management" AND behav* AND Stanford	PubMed/Medline	7

After aggregating the preliminary literature database, the design team combed through the articles and selected those that dealt with one or all three major areas of interest. The first area focused on the methodology used to conduct program evaluations including the study design (randomized control design; pretest/posttest), type of data analyzed (primary, secondary), target population (age, disability), selection biases, and ethical issues. The second area of our search focused on outcome variables and the tools used to collect and measure them. Examples of outcome variables included functional outcomes, clinical/health outcomes, self-reported outcomes (e.g., quality of life, well-being), social/behavioral outcomes, and health service utilization. The third area of our search focused on program characteristics such as types of beneficiaries studied and program setting. Additional searches were completed to supplement missing concepts as needed. Results were hand-checked for duplicates and for articles outside of the search parameters, producing a total reference list of 44 peer-reviewed articles.

As resources and references were identified, they were stored in a literature database developed by the design team. This organizational data extraction tool incorporated all empirical information gathered through the literature review, including an on-going list of stakeholders and experts in the field who may be appropriate for participation in the project's Technical Expert Panel. Each row in this tabular summary (see Appendix A) presents one published article with columns that note the citation, study design, program name, mode of intervention, data collection strategy, and key findings.

In addition to the Key Article Review table seen in Appendix A, we also completed a data extraction and created a 'one-page snap shot' of the major findings from each of the 25 peer-reviewed CDSMP studies with quantitative data (all design types) in Appendix B. These tables allow us to review outcome measures of interest and develop summary statistics from reviewed articles. To extract additional information relevant to the evaluation design, we created a table (see Appendix C) that identifies fidelity

to Stanford CDSMP, study randomization, site information, screening procedures, and country or region of study.

All abstracts and reviews were also maintained in an Endnote X4 database for easy extraction and manipulation. The design team also obtained and maintained a hard copy library of all items reviewed.

### **3. Evaluation Methods**

#### **3.1 Design Types**

The studies reviewed by the design team most commonly evaluated CDSMPs and other condition-specific self-management programs through two designs: a non-randomized pre-post test design and randomized controlled trial (RCT) design. While both evaluation designs use a similar approach to data collection (e.g., baseline and follow-up), RCT designs add value by randomizing participants into control or intervention groups, allowing causality to be inferred in the analysis of results. Individual respondents were the unit of analysis for a majority of the empirical articles reviewed. Comparisons between CDSMP programs (i.e. Arthritis self management program versus generic CDSMP) were also analyzed.

##### **3.1.1 Non-randomized Pre-Post Test Design**

Several of the studies reviewed in this report utilized a non-randomized pre-post intervention design with no control group to assess outcome measures at baseline and again at various intervals after the implementation of the self-management program intervention. This type of longitudinal design compares changes in outcomes over time but precludes the inference of causality since the sample is not randomized and does not contain a control group. Rather, participants in the study comprise the intervention group, all of whom are followed before and after the CDSMP.

By nature of the research design, each study tracked participants and administered follow-up questionnaires after the intervention of the CDSMP. While some studies followed up with participants only once after four to six months post-intervention (Bedell, 2008; Gitlin, et al., 2008; Rose, et al., 2008), other studies utilized multiple data collection intervals to evaluate the self-management program—in these cases, data collection occurred at baseline, four to six months post-intervention, and 12 months post-intervention (Barlow, Wright, Turner, & Bancroft, 2005; K. Lorig, et al., 2008; K. Lorig, Ritter, & Jacquez, 2005; K. Lorig, Ritter, & Plant, 2005; K. R. Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001; Sobel, 2002). Two studies (Barlow, et al., 2005; K. Lorig, et al., 2001; Sobel, 2002) tracked the participants up to two years following the onset of intervention. Findings from these studies, as well as from randomized studies, are summarized in Section 3.2.

One pre-post test study reviewed by the design team analyzed secondary, administrative claims data. Ahmed et al. (2006) compared claims data from enrollees in managed care organizations to calculate beneficiary-level changes in cost of care, and utilization of various health care services. In addition, medical claims and medical charts were reviewed to assess selected HEDIS quality indicators (Ahmed & Villagra, 2006).

### **3.1.2 Randomized Controlled Trial Design**

Sixteen of the studies reviewed for this report utilized RCT designs. In this approach, participants are randomized into treatment or control groups. Of the studies reviewed, approximately one-half focused explicitly on the CDSMP (Barlow, Turner, Edwards, & Gilchrist, 2009; Kendall, et al., 2007; K. Lorig, Hurwicz, Sobel, Hobbs, & Ritter, 2005; K. Lorig, Ritter, & González, 2003; K. Lorig, Ritter, Laurent, & Plant, 2006; K. Lorig, et al., 1999; Smeulders, et al., 2009; Swerissen, et al., 2006). Populations included in these trials ranged from persons with chronic disease in general to those with specific chronic diseases such as diabetes, stroke, heart disease, or inflammatory bowel disease. All programs were implemented in community settings, except one that examined the effect of an internet-based CDSMP (K. Lorig, et al., 2006).

Although one study was randomized at the workshop-level (Goeppinger, Armstrong, Schwartz, Ensley, & Brady, 2007), most of the CDSMP trials included in this review randomized participants into treatment and control groups at the individual-level. Randomization occurred after baseline data collection, often using a blinded randomizer strategy. Five of the CDSMP trials used a straightforward wait-list method for control group participants, such that all control group members had the option to enroll in a CDSMP after the study period (usually six-months). Barlow and colleagues (2009) enhanced their treatment and wait-list control group design by adding a second, non-randomized control group consisting of individuals who explicitly reported disinterest in participating in the CDSMP, for which baseline and follow-up data were collected and analyzed.

To ensure that a sufficient number of participants were selected into CDSMP treatment groups, many studies used specific randomization ratios, such as a 3:2 (K. Lorig, et al., 2003), 2:1 (Barlow, et al., 2009), or 6:4 (K. Lorig, et al., 1999) treatment-control ratio. One study investigating outcomes of CDSMP participants across different ethnic groups used a stratified sampling approach before randomizing participants into treatment and control groups (Swerissen, et al., 2006). In this design, eligible prospective participants were stratified based on spoken language and geographic area, and then randomization occurred at a 2:1 treatment-control ratio.

Several RCTs were conducted on programs similar to or adapted from the CDSMP intervention model (Jerant, et al., 2009; Powers, Olsen, Oddone, & Bosworth, 2009; Richardson, et al., 2008). Adaptations were made to accommodate the method of identifying participant eligibility (e.g., self-report rather than physician diagnosis; Richardson et al., 2008) or for use as a disease-specific program, such as hypertension (Powers, et al., 2009).

### **3.1.3 Data Collection Methods**

The most common type of data collection across the non-randomized and RCT studies included in this review were self-administered, self-reported questionnaires that were mailed to participants at baseline and pre-determined follow-up intervals (including one, four, six, and twelve months). Some studies, however, used additional data collection methods, such as telephone interviews (Barlow, et al., 2005; Beckmann, Strassnick, Abel, Hermann, & Oakley, 2007; K. Lorig, Hurwicz, et al., 2005; K. Lorig, Ritter, & Jacquez, 2005) and one-on-one in-person interviews (Jerant, et al., 2009). These interviews gathered more qualitative, in-depth data than the mail surveys, although in a study by Lorig et al. (K. Lorig, Ritter, & Jacquez, 2005), telephone questionnaires were administered to increase response rates at follow-up and addressed the same items as the mailed questionnaires.



One study reviewed by the design team used a qualitative approach to explore the experiences of participants in cancer-specific and generic CDSMP groups (Beckmann, et al., 2007). Telephone-administered, semi-structured interviews were conducted with 25 participants of a cancer-specific CDSMP, and with 10 participants in a general CDSMP.

#### **3.1.4 Attrition**

The estimated attrition rate is an important consideration when designing any evaluation study. For the CDSMP evaluation it is important to review the literature on attrition in similar studies for two primary reasons. First, because the CDSMP is comprised of vulnerable populations, it would not be surprising if study participants have a higher than average dropout rate due to illness and death. High dropout rates could impact longitudinal outcomes due to reduced sample sizes. Analyses conducted with insufficient statistical power may fail to detect pre- and post-program differences. Second, differential attrition rates between control and treatment groups should also be examined in the literature. If studies show that attrition is random, then it is not a problem because respondents would be as likely to drop from the treatment group as they are to drop from the control group. However, if the articles reviewed indicate differential rates of attrition (i.e., consistently greater for one group over the other), then consideration should be given when developing the sampling plan and randomization to account for these differences.

A number of CDSMP studies included in this review measured outcomes at baseline, four or six months post-intervention, and 12-months post-intervention (Barlow, et al., 2009; K. Lorig, et al., 2003; K. Lorig, Ritter, & Jacquez, 2005; K. Lorig, et al., 2006). For non-randomized pre- post-test design studies, attrition ranged from 13 percent for baseline to first follow-up, to 18 percent for baseline to 12 month follow-up (Lorig et al., 2005). For RCTs, attrition ranged from 21 percent for baseline to first follow-up, to 51 percent for baseline to 12-month follow-up (K. Lorig, et al., 2003).

Other RCTs reported data collection at baseline and 6-month post-intervention. Lorig et al. (1999) enrolled 1,140 participants into their study at baseline, and were able to collect follow-up data on 84 percent of treatment and 82 percent of control group participants. Reasons for attrition of those for whom follow-up data was not collected included death (1.2 percent of treatment, .81 percent of control) and illness (3.4 percent of treatment, 7.8 percent of control). Reasons for dropout were reported as unknown for 11.4 percent of treatment and 9.4 percent of control group participants (Lorig et al., 1999). Of the 728 participants enrolled an Australian RCT (Swerissen, et al., 2006), 254 (34.9 percent) withdrew for reasons including changing their minds, family/personal issues, traveling, difficulty completing forms, feeling unwell, feeling as if too much personal information was being requested, busy schedules, death, or due to inaccurate or out-of-date contact information.

#### **3.1.5 Screening**

The screening process for selecting participants into the study was not always explained. Screening sometimes involved selection of participants with particular disease or condition while others were based on ethnic background and income. The studies describing screening criteria mentioned exclusion by age, language ability (i.e. reading, writing English), eyesight, mental health, or previous participation in a CDSMP.

### 3.1.6 Randomization

CDSMP studies were randomized by individual or group. Nine of the RCT studies were randomized individually by participant. The randomization strategy for the remaining studies were randomization by CDSMP group (receiving generic versus disease-specific CDSMP: Goeppinger, Armstrong et al, 2007); by facility and individual (Ersek, Turner, Cain, & Kemp 2008); by provider (PCP) and individual (Powers, Olsen, Oddone, & Bosworth, 2009); and serially (Lorig, Sobel et al, 1999).

### 3.1.7 Fidelity to Stanford CDSMP

In the data extraction effort (see Appendix C), we considered each program's fidelity to the Stanford CDSMP model. In seven of the twenty-five peer reviewed studies with quantitative data, there was no stated modification. Of those, four were pre-post and three were RCTs. Four studies, one of which was online, adhered to the NHS-run Experts Patient Programme version of the CDSMP. While this nationally implemented program follows the CDSMP model, it is slightly adapted to the British public and is always led by two lay leaders. Three of the studies reviewed were modified to older urban African American populations (Rose et al, 2008; Haas, Group, et al, 2005; Gitlin, Chernet et al, 2008). Modifications such as language and focus on a reduced-sugar diet were included.

Two studies used the Spanish-language version of the CDSMP, 'Tomando Control de Su Salud,' which is not a direct translation of the CDSMP and has cultural modifications (Lorig, Ritter, Gonzalez et al, 2003; Lorig, Ritter, & Jaquez, 2005). Six studies were modified for a particular disease or condition (i.e. arthritis, stroke, pain, multiple sclerosis, HIV/AIDS) and one study used a CDSMP variant 'Homing in on Health' (Jerant, Moore-Hill, & Franks, 2009). The mode of intervention also varied, with one study utilizing a telephone only intervention while another was online only. One Australian study (Swerssen et al, 2006) was modified by participant's first language (Vietnamese, Chinese, Italian, Greek). Of the twenty five studies reviewed, four took place in England, three took place in Australia, one in the Netherlands, and part of one study took place in Chihuahua, Mexico (K. Lorig, Ritter, & Jaquez, 2005).

## 3.2 Evaluation Methods - Summary of the Findings

A significant number of CDSMP studies (16 of 44 reviewed) have utilized RCT-type designs, randomizing individual CDSMP participants into treatment and control participants post-baseline data collection.

Modest improvements were reported in two of the studies (Powers, et al., 2009; Richardson, et al., 2008), while a study investigating a chronic disease self-management program implemented in the home reported little difference in outcomes between the control and intervention group participants (Jerant, et al., 2009). Further, in a trial investigating the effect of a chronic pain self-management program on a sample of older adults living in retirement communities, Ersek and colleagues (2008) failed to reveal significant intervention effects.

Despite a quarter of the RCT studies found no difference in most health outcomes for treatment and control groups (Ersek, Turner, Cain, & Kemp, 2008; Haas, et al., 2005), in general, the CDSMP evaluation studies that were reviewed revealed improved health and psychological outcomes for participants, in varying degrees. Some of the variation in evaluation findings might be attributed to factors such as the amount of time between the onset of the program and the follow-up period, or the demographic characteristics of program participants. For example, (K. Lorig, Ritter, & Jaquez, 2005) found significant improvements in health behaviors and a reduction in health care utilization at four months post-

intervention; however, improvements in self-efficacy did not reach significance until 12-month follow-up data collection.

Most studies utilized self-reported outcomes as the data of choice for evaluating outcomes; few discussed combining self-reported data with administrative or other data sources (e.g., claims, health assessments administered by clinicians, medical records).

## **4. Outcomes Studied**

In all reviewed RCTs, participants were asked to self-report changes in a number of different areas surrounding their mental and physical health, as well as changes in how they utilized health care. These measured outcomes varied among studies, but four of the original Stanford CDSMP measures were the most common: health behavior, health status, health care utilization, and self-efficacy. Data were collected at baseline and at pre-determined follow-up intervals. For some indicators, clinical records were used as confirmation of self-reported results. Though psychological well-being indicators such as depression appeared in several studies as outcome measures, no psychometric properties were reported as a method of assuring validity and reliability of the responses.

### **4.1 Health Behavior**

A set of scales were developed and validated by the Stanford Patient Education Research Center for use in CDSMP studies, including a scale for four health-related behaviors as follows: stretching and strengthening; aerobic exercise; use of cognitive symptom management techniques; and use of techniques to improve communication with health providers (K. Lorig et al., 1996, Rose et al., 2008). Other studies include additional measures of health behavior depending on the condition studied, such as smoking, drinking, and body mass index (as a proxy for diet) for individuals suffering from heart disease, as these behaviors are known to exacerbate the disease (Smeulders, et al., 2009).

### **4.2 Health Status**

Health status in US studies was based on the self-rated health scale used in the National Health Interview Survey, and on a modified version of the Health Assessment Questionnaire (HAQ) physical disabilities scale (K. Lorig, et al., 1996). Indicators measuring health status are all self-reported and included items such as self-rated health, disability, social/role activities/limitations, pain, illness intrusiveness, energy/fatigue, health distress, and shortness of breath (Du & Yuan, 2010; Foster, 2009; Rose, et al., 2008; Sobel, 2002).

### **4.3 Health Care Utilization**

Health care utilization indicators used in the reviewed studies generally assessed three types of utilization, and are measured as such during statistical analysis: 1) visits to physicians, including visits to the emergency room that do not result in hospital admission; 2) visits to the hospital during intervention period; and 3) number of nights spent in the hospital. Other studies included more detailed reporting for inpatient and outpatient procedures, readmission, and procedure rates. Program success in health care utilization was assessed by the decrease or reduction in utilization. No specific instruments to measure health care utilization were presented in these studies; rather, participants self-report on questionnaires and the responses are checked against the participant's clinical records. Some studies

show that reductions in health care utilization can also reduce health care expenditures (K. Lorig, et al., 1999; Swerissen, et al., 2006); these are further discussed below.

#### **4.4 Self-Efficacy**

Self-efficacy is the theoretical foundation of the CDSMP. Du and Yuan (2010) regard self-efficacy as the “most important evaluation indicator of self-management outcomes, composed of efficacy expectations and outcome expectations” (Du & Yuan, 2010). Efficacy is measured as the perception of an individual as to whether s/he can perform a certain behavior (efficacy expectations) and whether a specific behavior will cause a certain outcome (outcome expectation). While self-efficacy is used as an outcome measure for most studies reviewed by the design team, it is also often used as a predictor of future health outcomes. The self-efficacy measures developed by Lorig et al. at Stanford University were used most often in the studies reviewed for this report (Barlow, et al., 2009; Du & Yuan, 2010; K. Lorig, et al., 2001).

Self-efficacy measures are based on two scales that were developed and designed specifically for the CDSMP. The scales measure a participant’s perceived adaptability to manage the disease and manage the symptoms, and are rated by respondents on a scale that ranges from 1-7 with a one indicating low self-efficacy and a seven indicating high self-efficacy. The sum of the two scales provides the overall self-efficacy score (10 to 70 points). Barlow and colleagues (Barlow, et al., 2009) reported results on general self-management self-efficacy and multiple sclerosis self-efficacy using the Liverpool Self-Efficacy Scale. Results indicated an improvement in both types of self-efficacy at four months, but not at the 12-month follow-up.

Some studies that measure self-efficacy report the correlations between self-efficacy and outcome measures. Lorig and colleagues (2001) reported that higher levels of self-efficacy are associated with lower outpatient service utilization. In support of these findings, a more recent study showed that lower reported levels of self-efficacy were associated with higher levels of depression (Barlow, et al., 2009). However, caution should be taken when interpreting the results of correlation analyses; since data on both measures were collected at the same time, causation cannot be determined. Based on these findings, the evaluation contractor should consider including self-efficacy as an outcome measure, controlling for levels of depression.

Self-efficacy theory, developed by Albert Bandura, states that high-level self-efficacy is a prerequisite to realizing self-management goals, as well as critical in determining whether a person will maintain or improve their health status (Bandura, 1989 as cited in (Du & Yuan, 2010)). For this reason, a participant’s belief in his or her ability to manage the condition can also act as a predictor of health outcomes. For example, Lorig and colleagues (K. Lorig, et al., 2006) found that change in self-efficacy at six-months was associated with health status at one year.

#### **4.5 Other Outcomes**

##### **4.5.1 Quality of Life**

Quality of life (QOL) was measured in studies using common indicators and accepted scales such as the Flanagan Quality of Life Scale (Bedell, 2008), the pain and fatigue scale adapted by Lorig et al. (Goeppinger, et al., 2007), and the Quality Adjusted Life Years (QALY) profile (Kennedy, et al., 2007; Richardson, et al., 2008). Though many indicators for QOL overlap with those for health status, they

provide a multidimensional view of self-management effectiveness. Du and Yuan stated in their self-management outcomes evaluation study that QOL and health status reflect effectiveness and effects of self-management programs because “QOL refers to subjective feels towards life, while health status emphasizes an objective condition of living status” (2010).

#### **4.5.2 Health Outcomes in CDSMP versus Condition-Specific Programs**

In 2005, Chodosh, Morton et al. used empirical data from a systematic review of 53 studies (780 were screened) to quantitatively evaluate RCTs of chronic disease self-management programs for older adults. The authors attempted to answer two research questions:

1. Do self-management programs result in improved outcomes for specific chronic diseases of high prevalence among older adults (namely diabetes, hypertension, and osteoarthritis)?
2. For effective interventions, are there specific components – i.e., characteristics such as tailoring programs to specific health conditions, group setting, feedback, psychological emphasis, and medical care - that are most responsible for these observed effects?

While analyses showed the use of feedback in diabetes programs, group settings in hypertension programs, and tailoring in osteoarthritis programs to be effective, these results did not retain statistical significance when examined across conditions (Chodosh, et al., 2005). Instead, the study suggests that the attributes of a condition-specific program are responsible for these positive results. Consequently, this study suggests that condition-specific tailoring will allow for improved health outcomes by focusing on the interventions most effective for each condition rather than more generally.

One study reviewed by the design team used a qualitative approach to explore the experiences of participants in cancer-specific and generic CDSMP groups (Beckmann et al., 2007). Qualitative analyses of responses revealed themes related to decreased sense of isolation, increased motivation to improve one’s health and wellbeing, and improved sense of control and achievement. Findings from this study suggest that a disease-specific model may be more beneficial as cancer participants found the information to be more relevant to their condition, and experienced more bonding with other participants, compared to the generic CDSMP.

#### **4.5.3 Cost Effectiveness**

An important outcome measure relates to the cost effectiveness of self-management programs. As defined in the reviewed articles, cost effectiveness is demonstrated when there is a reduction in overall cost of health care utilization and no deterioration of health outcomes for a CDSMP participant. Though reduction in cost for some studies were generated from the savings of reduced ER visits, hospital visits, and overnight stays (K. Lorig et al., 2001; K. Lorig et al., 1999), two studies used Quality Adjusted Life Years as an indicator of health gains (Kennedy et al., 2007; Richardson et al., 2008). Data on resource use were combined with unit cost data to provide estimates of overall costs per patient, including the estimated cost of the self-management program per patient.

Kennedy, Reeves, et al. (2007) studied the cost effectiveness of the generic Expert Patients Programme (EPP) in the United Kingdom by estimating the cost of the program per participant, comparing the reduction of health care utilization among intervention and control groups. The authors found that, though not statistically significant, the reduction in resource use would off-set the cost of participants

for the program. Additionally, the study utilized the net benefit approach, which includes the “societal perspective (including the costs to patients) with effects assessed in terms of health gains, measured in terms of QALYs”.

Though some studies found that tailoring self-management programs to the specific disease can improve outcomes more than a generic CDSMP, the generic CDSMP may be more cost effective. As stated in Goeppinger, Armstrong, et al. (2007), “population density, community resources, participant levels of comorbidity, and professional and participant preferences” influence the preference for a generic versus condition-specific self management program.

#### **4.6 Outcomes - Summary of Findings**

The literature reviewed by the design team demonstrates that overwhelmingly investigators agree that self-efficacy is a critical concept to measure when evaluating a CDSMP program; however, how it is used analytically is inconsistent across studies. Scales developed by Lorig and colleagues (1999) have been widely used to measure this outcome.

Measures of health status and health behaviors are also common, with studies looking specifically at self-rated health, degree of pain and discomfort, role limitations, time spent engaging in exercise and other indicators through the use of validated scales. One study reviewed included the validation of one particular measurement developed specifically for self-management program outcome evaluation -- the Health Education Impact Questionnaire (HEIQ), which was shown to have strong psychometric properties including validity (Osborne, Elsworth, & Whitfield, 2007).

Health care utilization has been examined as an outcome, primarily through the use of self-reported visits to physicians and emergency rooms, and number and duration of hospital stays. One study relied on analysis of claims data from participants enrolled in a managed care organization (Ahmed & Villagra, 2006). In addition, cost-effectiveness of self-management programs has been assessed to demonstrate potential reductions in health care utilization (Kennedy, et al., 2007; Richardson, et al., 2008).

While some studies found that tailoring self-management programs to the specific disease can improve outcomes more than a generic CDSMP, the cost effectiveness of the generic CDSMP may prove to be most beneficial to both patients and Federal programs funding CDSMPs. The Goeppinger, Armstrong, et al. (2007) study investigated the cost effectiveness of an arthritis-specific program versus that of a generic CDSMP and found that CDSMP is in fact more cost effective when used for populations with arthritis and multiple comorbid conditions (vs. the arthritis-specific program).

### **5. Program Characteristics: Potential Predictors and Confounding Factors**

Throughout our review and extraction of information from the literature, we attended to program characteristics that have the potential to influence participant outcomes, such as race or ethnic differences, the location at which the intervention occurred, or the mode of program transmission (e.g., community group meetings, on-line). This information will be used to determine potential implementation-related variables to include in the AoA CDSMP evaluation design, so that the study will have the ability to detect any differences in outcomes associated with these factors.

#### **5.1 Population Targeted**



The vast majority of the articles synthesized for this review reported on studies that evaluated the Stanford University CDSMP (Gitlin, et al., 2008; K. Lorig, Hurwicz, et al., 2005; K. Lorig, Ritter, & Plant, 2005) or the British version of the CDSMP, the EPP (Kennedy, et al., 2007; K. Lorig, et al., 2008). Although the Stanford CDSMP and its off-shoot, the EPP, were designed to be inclusive of a variety of chronic diseases, recent studies have examined the effectiveness of these and other similar programs on specific disorders (Goeppinger, et al., 2007; Haas, et al., 2005; K. Lorig, Ritter, & Plant, 2005). In addition, studies on the efficacy of the CDSMP for Spanish-speaking recipients have been reported (K. Lorig, et al., 2003; K. Lorig, Ritter, & Jacquez, 2005). In the following sections we present an overview of demographic variables that were reported in the reviewed literature that may be important to consider in the CDSMP evaluation design.

### **5.1.1 Chronic Conditions**

The Arthritis Self-Management Program (ASMP) was the first CDSMP implemented and was designed to assist a disease-specific population cope with one chronic condition. The Stanford University CDSMP, modeled after the ASMP, expanded eligibility to include participants with varied chronic conditions. These more generic CDSMPs have been found in multiple studies to have significant positive results on self-efficacy, health status, health behaviors, and healthcare utilization (Beckmann, et al., 2007; K. Lorig, et al., 2001; K. Lorig, et al., 2008; K. Lorig, et al., 2003; K. Lorig, Ritter, & Jacquez, 2005; K. Lorig, Ritter, & Plant, 2005; K. Lorig, et al., 1999); Steward et al., 1999).

Although there are many generic CDSMPs today, including the United Kingdom EPP, there are also numerous self-management programs that target one specific disability or disease (Armstrong & Powell, 2008; Battersby, et al., 2009; Beckmann, et al., 2007; Bedell, 2008; Cummings & Turner, 2009; Ersek, et al., 2008; Goeppinger, et al., 2007; Haas, et al., 2005; Kendall, et al., 2007; Rogers, Kennedy, Nelson, & Robinson, 2005; Smeulders, et al., 2009) or two (Chodosh, et al., 2005; Powers, et al., 2009).

Considerable research has been conducted to compare the efficacy of condition-specific programs to generic CDSMPs. As cited earlier, Goeppinger and colleagues (Goeppinger, et al., 2007) compared the cost effectiveness of a generic CDSMP with an Arthritis Self-Help Course, and found positive benefits for arthritis patients from both programs. The results of this study suggest that generic CDSMPs may be a more cost-effective approach to self-management. However, Lorig, Ritter, and Plant (K. Lorig, Ritter, & Plant, 2005) found improvement in more outcomes measured among arthritis patients who participated the Arthritis Self-Management Program than in those who participated in the generic CDSMP, particularly at four-months. In contrast to the Goeppinger study, these findings indicate that disease-specific programs should be considered first as long as there are sufficient resources and interested participants.

### **5.1.2 Age groups**

CDSMPs were originally designed to empower seniors to better self-manage their chronic conditions and improve their physical and mental health. The mean age of a majority of the studies reviewed was 60 years and older (see summary table in Appendix B). However, many of these programs include adults under the age of sixty. For example, Goeppinger et al. (2007) included adults 18 and over in a comparative study of a small arthritis education program against a traditional CDSMP. Gordon's review of the CDSMP literature (Gordon, 2008) shows that many U.S. CDSMP programs are inclusive of middle-aged adults (i.e., 40 years old and older). Although many of the CDSMP reviews that included adults under the age of sixty were conducted in the United States (Goeppinger, et al., 2007; K. Lorig, et al.,

2001; K. Lorig, et al., 2003; K. Lorig, et al., 2006; K. Lorig, et al., 1999), several were conducted in the United Kingdom and Austria where they typically include adults 18 years and older (Barlow, et al., 2005; Battersby, et al., 2009; Kennedy, et al., 2007).

Age is reported in most studies to describe the sample; however, only one report (Nolte, Elsworth, Sinclair, & Osborne, 2007) analyzed the effect of age differences on outcome measures. This review of Australian CDSMPs revealed that younger participants, particularly younger women, reported benefits of the self-management program on most outcomes measured while few older adults showed improvement.

### **5.1.3 Race and Ethnicity**

Relative to the number of studies that have been undertaken to evaluate the CDSMP and other similar self-management programs, very few have explored the benefits of these programs among ethnic groups. In fact, overwhelmingly, the samples included in the studies reviewed for this report were predominately white and female. However, a study among Hispanic-Americans in Northern California showed continued significant improvement in all health behaviors and health status outcomes at 12-month follow-up as compared to baseline. In addition, there was significant improvement in emergency room visits that persisted through the 12-month follow-up, although no significant differences were found in the number of physician visits, or hospital days (K. Lorig, et al., 2003). Similarly, in a study that examined the Spanish-language version of the CDSMP along the Texas, New Mexico, and Mexico border (K. Lorig, Ritter, & Jacquez, 2005), participants showed improvements in health behaviors, health status, and self-efficacy at both four- and 12-month follow-up interviews.

Another study evaluated a CDSMP program that used an adapted version of the CDSMP training manual, developed with rural, African American older adults (Rose, et al., 2008). The study found improvement in health behaviors and health status among the sample of rural older African Americans; however, several outcomes measured did not persist to the six-month follow-up interview.

### **5.1.4 Beneficiary Types**

The majority of studies reviewed for this report recruited samples through public advertisement and word of mouth, and did not document beneficiary type. Only one article reviewed identified a Medicaid population (Rosenman, et al., 2006), and none reported specifically on Medicare recipients. However, a few of the investigations selected samples from specific beneficiary populations such as managed care organizations (MCO) and provider networks (Ahmed & Villagra, 2006; Jerant, et al., 2009; K. R. Lorig, et al., 2001; Sobel, 2002). Ahmed and Villagra (Ahmed & Villagra, 2006) evaluated the impact of a comprehensive Diabetes Disease Management Program (DDMP) on cost and quality across ten US urban markets, and concluded that the DDMP improves quality of care and reduces overall medical costs in MCOs. In addition, patients from a Veteran Affairs Medical Clinic were recruited for participation in a hypertension self-management program (Damush, et al., 2010; Powers, et al., 2009) to test program spillover effects for patients with diabetes and high cholesterol. Although the results were mixed, demonstrating a significant positive effect for self-managing diabetes but not cholesterol, the authors conclude that disease-specific self-management programs may have spillover effects on patients' comorbid conditions.



### 5.1.5 Dual Eligibles & Medicaid funding in the CDSMP context

Vulnerable populations, such as those receiving Medicaid services, are underserved by evidence-based medicine programs (Counsell, 2010). This section explores dual eligibles and the importance of Medicaid funding in the CDSMP context through a review of the grey literature. While there is evidence of potential cost-savings and benefit to this group, it may not be possible in the short term to include dual eligibles in the evaluation design. Only one of the articles from the literature review provides information about the Medicaid population (Rosenbaum, et al, 2006). However, an online search of CDSMP programs and mention of the Medicaid population, found that states such as New York are beginning while others (Maryland) intend to include the population in later years of the program (NACDD, 2010). With their state data indicating that 5% of Medicaid chronic care population accounts for 50% of the Medicaid health care expenses (Goehring, 2010), Washington State now offers reimbursement for diabetes SMP and aims to provide CDSMP reimbursement for Medicaid.

Based on high health care expenditures for Medicaid participants who also receive Medicare (dual eligibles), it is likely that inclusion of this population would result in cost savings to Medicare. Dual eligibles include 9 million low-income elderly and disabled Medicare beneficiaries who qualify for coverage based on their low income. Medicaid covers important services and co-pays that Medicare limits or does not cover, such as long-term care. Dual eligibles account for 18% of Medicaid enrollees but 46% of Medicaid spending. The management of chronic conditions in this group is likely to result in substantial savings. The dual eligible population is also growing. Medicaid coverage rates for the community among the over 65 population increased from 7.6 percent in 1987 to 14.1 percent in 1996.

While it is unclear what proportion of CDSMPs are Medicaid beneficiaries, there may be more data on this population in the near future. ARRA funded CDSMPs require the State Medicaid Agency to be involved in the development and implementation of the program (AoA, 2010). The new CDSMP programs are required to give special attention to serving low-income, minority and limited English speaking older adults, including Medicaid eligible individuals. In Rhode Island, Medicaid brought CDSMP to the State in 2006 in conjunction with the Department of Health and the Department of Elderly Affairs (Arora et al, 2008). Existing disease-management programs similar to CDSMP may develop specific programs for dual eligibles. In Florida, dual eligibles can participate in a LifeMasters program, or a Medicare Disease Management Demonstration, providing services to certain chronically ill beneficiaries (Edlin, 2006). LifeMasters tests whether disease management in the traditional fee-for-service (FFS) program leads to improved outcomes and lower total costs to the Medicare program, and has demonstrated substantial savings for the Medicaid population (Business Wire, 2003).

According to a recent CDC brief, a few states are moving toward Medicaid reimbursement for CDSMP (Gordon & Galloway, 2010; [www.healthyagingprograms.com](http://www.healthyagingprograms.com)). While this has been occurring on a relatively small scale to date, the brief reports one state has Medicaid clinics specializing in asthma and diabetes and patients receive referrals to CDSMP programs. Another strategy has been to train Medicaid managers to run CDSMP programs within their clinics. A Partners in Care Foundation conference in 2010 argued from a Social Enterprise Reimbursement Model that once Medicaid accepts CDSMPs as a reimbursable benefit, they can cover the benefit under the Medicaid Waiver program. The state of Washington amended their Aged/Disabled Waiver to include provision of CDSMPs and California is pursuing a similar strategy. There are a number of insurers reimbursing CDSMPs, including Kaiser Permanente, who serves as the U.S.'s largest non-profit health plan; the NHS providing the world's largest publicly funded CDSMP program, and the LA Care Health Plan, who offer the nation's largest

public health plan. Through Oregon's "Living Well" program, CDSMP coaches refer Medicaid Fee-for-Service clients to programs in their area.

An ARHQ User Guide on implementing Medicaid disease management programs (Arora et al, 2008) sheds light on how inclusion of the Medicaid population into CDSMP programs may mean adapting the program to meet their needs. Communication and social supports are important issues for individuals in the Medicaid program. Public distrust of Medicaid and other public programs creates barriers to contacting members. During a health intervention in Indiana, it was discovered that members were not opening mailings from the program because the envelopes had the same logo as the Medicaid program. After Indiana changed the envelopes to have a program specific logo, members began to open them. In addition to differences in recruiting Medicaid members, states must anticipate that members may have low literacy levels. It is vital that program materials target an appropriate reading level and be made available in prominent languages. Informal focus groups with select Medicaid members may facilitate communication with members and illuminate "perceived barriers" to communication.

Despite benefits to the Medicaid population, it may not be possible include them in the evaluation design. However, this issue will be explored further during upcoming site visits to CDSMPs. Obtaining Medicaid data and linking it to Medicaid claims data is both difficult and sometimes extremely complicated to compare across states, and this creates a barrier to inclusion of the Medicaid population. Depending on the research question and variables of interest, it may also be an unreliable source of data. Because Medicaid is funded through federal and state funds, the benefits vary greatly and there are disparities in access to health care as well. This issue will be explored further in the evaluation design report.

## **5.2 Mode of Intervention**

The traditional CDSMP and EPP consist of two and a half hour workshops once a week for six weeks and are generally administered in community setting such as churches, libraries, YW/MCAs, senior centers, public housing projects, community health centers, and cooperative extension programs. Only one study reviewed reported on the distribution of the location of the workshops, but did not report on the effectiveness of holding the workshops in one location over another (Haas, et al., 2005).

Several self-management programs are designed to accommodate homebound adults or adults who for other reasons prefer not to attend group sessions in the community. On-line versions of the CDSMP (K. Lorig, et al., 2008; K. Lorig, et al., 2006) and EPP (K. Lorig, et al., 2008) are available, and have demonstrated positive benefits such as decrease in symptoms and health care utilization, and improvement in health behaviors, self-efficacy, and satisfaction in the health care system. The on-line version of the CDSMP may be a viable option for persons with chronic disability who prefer not to attend group sessions and who are computer savvy.

A study of an in-home self-management program failed to demonstrate lasting positive results (Jerant, et al., 2009). The authors concluded that, despite leading to improvements in self-efficacy compared to those in CDSMP studies, the in-home program had limited sustained effects and probably was not a cost-effectiveness option from the health system perspective.

## **5.3 The Role of Funding Agencies in CDSMPs**

The purpose of this literature review is to inform an evaluation design for AoA funded CDSMPs. However, the studies identified in the literature focused almost exclusively on non-AoA funded CDSMPs which may differ from AoA funded CDSMPs because of differences in program setting. In order to bridge that gap, we conducted a review of the grey literature to understand CDSMPs in AoA-funded settings and, in particular, to determine whether and how AoA-funded CDSMP programs are different from other CDSMP programs. In a structural sense, CDSMPs in AoA-funded settings benefit from the National Aging Network, which includes 56 State Units on Aging, 629 Area Agencies on Aging, 244 tribal organizations, some 20,000 local community service organizations, 500,000 volunteers, and a wide variety of national organizations (Tilly, 2010). Therefore, it is reasonable to define AoA's role as providing a tremendous amount of resources to CDSMPs and linking CDSMPs to a larger service delivery system. The following section will examine 1) how the AoA describes their role; 2) non-AoA funded CDSMPs; and 3) other setting factors and reporting structures, in order to inform the CDSMP evaluation design.

### **5.3.1 CDSMPs in AoA-funded Settings**

AoA began funding evidence-based programs in 2003, working with a variety of federal agencies, the Aging Network and other partners. Since 2006, this grant funding has resulted in the delivery of evidence-based programs to 25,000 seniors in over 1,200 community-based sites across 27 states (AoA Fact Sheet, <http://www.healthyagingprograms.org>). AoA administers the grant program, and has a contract with the National Council on Aging (NCOA) to provide Technical Assistance to CDSMP grantees. Technical Assistance includes web-based training, on-site visits, target teleconferences, peer-to-peer mentoring, strategies and models for developing statewide CDSMP distribution systems, and strategies to sustain programs beyond the grant cycle. AoA plans to incorporate successful CDSMPs into its Aging Network's array of services and to provide ongoing support of these programs through technical assistance. In addition, many states are using OAA Title III-D funds to support CDSMPs (CITATION is personal contact via e-mail with AoA, 01/04/11).

### **5.3.2 CDSMPs in non-AoA funded Settings**

Another way to understand AoA's role in CDSMP programs is to compare to non-AoA funded programs. However, few of the articles reviewed for the literature review report the funding sources of the program, with the exception of international programs and those run by Kaiser Permanente. Still, it is possible to understand AoA's role by comparing AoA-funded programs to programs run in the United Kingdom (UK) by the National Health Service (NHS). An evaluation by Rogers et al (2006) considered the program within the NHS setting. The study discusses how CDSMP programs were difficult to adapt to the way NHS normally provides services, with a patient addressing a single condition with a health professional. The NHS-run CDSMP programs have conformity in who runs the program, being run through Primary Care Trusts (PCTs) by two individuals with personal experience of a chronic condition. However, AoA-funded CDSMPs must demonstrate fidelity to the Stanford model, which requires only one lay leader and another leader of varying background. In practice, some AoA-funded CDSMPs have lay leaders and health professionals or other volunteers. Because both the delivery and content of the NHS-funded CDSMP was prescribed with limited flexibility, it created tension and difficulty in meeting the needs of local communities (Rogers et al, 2006). Given the flexibility and diversity in AoA-funded CDSMPs, this may be less of an issue.

Similar to NHS-funding CDSMPs, Australian courses use a highly structured course protocol, but instead of lay leaders, use trained health professionals (Kendall et al, 2007). On a national level, the Australian

Commonwealth Department of Health and Ageing implemented the Sharing Health Care Initiative, which involved several large demonstration projects across a variety of settings (Commonwealth Government Department, 2005). As self-management courses are now being applied in a variety of settings and implemented at the government policy level, there is an urgent need to understand and document the impact of self-management courses across settings. Numerous controlled trials have been conducted across disease groups and have been summarized in meta-analytic and narrative reviews. These studies, however, suggest that self-management courses might not be suitable for all types of chronic conditions and population subgroups.

### **5.3.3 Other Setting Factors & Reporting Structures**

There is current research under way to explore how setting factors influence CDSMPs (K. Lorig, personal communication, Sept 7, 2010). A number of setting factors may influence AoA's role in particular and CDSMPs in general. Two factors that have a larger influence are the funding sources and the organization that administers the program. A third factor would be data or information collected by the CDSMP and what is required by funding source(s). Funding mechanisms for a CDSMP program are likely to influence AoA's role, with sometimes four or five organizations funding a CDSMP program, from both public and private entities, as well as interested community organizations. When sources of funding change, it is likely that AoA's role in the CDSMP will also change. A program that no longer receives funding from AoA may continue the partnership or may develop a relationship with new funding agencies. Stronger CDSMP programs that are able to become self-sustaining and acquire new funding may also be unique "best practice" programs.

The agency completing the training may also influence AoA's role, especially if there is a prior relationship with AoA. The agency that runs the CDSMP program will hold a license that makes them legally responsible and it may be a different agency than who funds the program. The organizations supervising and setting up the program will vary and range from small private organizations with state contracts to run the program to large organizations that have a history of running CDSMP programs (e.g. Kaiser Permanente). The leadership's relationship to AoA may also play a role. For example, a leader with prior experience working in the Aging Network will have a better sense of outside resources and services. The types of leaders running the programs are health professionals and non-health professionals; staff or volunteers; and leaders who are similar to program participants or different from program participants. The location of the site is another key setting issue. For example, how and where the program is advertised and whether participation is open or closed. The programs can take place in a public or private setting, ranging from churches and public libraries to senior centers. Some non-AoA funded CDSMPs are run in health facilities, such as primary physician offices. The same CDSMP program may take place in multiple venues.

Another way to compare AoA's role across diverse settings is to compare two programs that are similar in structure and resources. One method is to compare the per participant program cost. The resources allocated to a particular CDSMP are likely to impact the benefit to participants. The cost per participant of a CDSMP program varies from \$70 to \$200 depending on the program and the actual 2-year savings are between \$390 and \$520 (Lorig et al, 2001). An evaluation of a 7-week CDSMP Kaiser program reported an average cost per person to be around \$200 and the savings to near a 1:4 cost-to-savings ratio (Lorig et al., 2001). Another evaluation calculated the cost per participant for a 6 month program to be \$70 and the savings in health care expenditures to be around \$750 per participant, more than 10 times the cost of program (Lorig et al, 1999). The cost per participant in NHS programs is roughly 3 to 6 times greater than CDSMPs in the U.S. A study of cost effectiveness of a nationally implemented CDSMP

in the NHS estimated costs at \$489 per participant and a cost savings between \$721 and \$827 (Kennedy et al, 2007).

While the reports reviewed of Australian CDSMPs did not mention per participant cost, it was noted that the program was free for participants and they received reimbursement for travel. The per participant cost may vary for disease specific SMPs. Meta-analytic reviews (Chodosh et al, 2005) suggest that generic self-management courses might not be suitable for all types of chronic conditions and population subgroups. In the evaluation of an arthritis SMP, savings were found to be 4-5 times greater than the cost of the program. Per participant cost is one of the ways in which the CDSMP implementation sites will differ from one to another which may impact the outcomes.

Finally, reporting structures also vary by CDSMP program. Several CDSMP programs, such as the San Jose Trust in California, have established CDSMP programs and report data to AoA but receive no AoA funding. Even in the case of a CDSMP program with no AoA funding, AoA may have a role in how the program is run, through an established relationship. Finally, fidelity to Stanford CDSMP Program is also likely to influence AoA's role, as they are most familiar with the Stanford model and licensing. Only seven of the CDSMPs in the literature review are based solely on the Stanford model. There is some support for the idea that disease specific SMP may be more effective than generic CDSMP programs (Lorig, Ritter, & Plant, 2005).

The flexibility that AoA affords its CDSMP programs may be instrumental in their success. Given the diversity of CDSMP programs, AoA may have less of an influence than CDSMP programs run in England or Australia, but this flexibility may be key in meeting the needs of a diverse older population. Given the substantial heterogeneity in the settings of AoA funded CDSMP programs, it may be advisable to select the evaluation sites in such a way to include that variation (i.e., nationally representative sites).

#### **5.4 Program Characteristics: Summary of Findings**

Many studies reviewed for this report describe specific inclusion criteria related to certain chronic conditions, such as arthritis, cancer, or heart disease, while others stipulate the presence of any chronic disease as sufficient for participation. In general, findings revealed significant program effects for both the disease-specific (Barlow, et al., 2005; Beckmann, et al., 2007; Goeppinger, et al., 2007) and generic CDSMPs (K. Lorig, et al., 2001; K. Lorig, et al., 2003; K. Lorig, Ritter, & Jacquez, 2005; K. Lorig, Ritter, & Plant, 2005; K. R. Lorig, et al., 2001; Rose, et al., 2008).

When the two types of programs were compared head-to-head, there were seemingly contradictory findings of which program type emerged to lead to better outcomes. For example, one study found positive benefits for arthritis patients who participated in an arthritis-specific program and a generic CDSMP (Goeppinger, et al., 2007) while another study found more positive benefits for arthritis patients who participated in the disease-specific program over the generic program (K. Lorig, Ritter, & Plant, 2005).

Overall, the studies reviewed for this report included demographic characteristics as descriptive variables rather than as predictors or to stratify the sample. As noted above, only one report reviewed examined age as a predictor of benefits of the self-management program (Nolte, et al., 2007). This study revealed that younger participants, particularly younger women, reported benefits of the self-management program on most outcomes measured while few older adults showed improvement.

Most of the US based studies targeted populations of adults aged 40 and older while those in the UK targeted adults 18 years and older. The two key studies which demonstrated few or no significant differences between the CDSMP treatment versus control groups were conducted on populations of adults 65 years and older (Ersek, et al., 2008; Haas, et al., 2005). Thus, the effectiveness of CDSMPs on older adults does not seem to be established yet.

In addition to comparing disease-specific to generic programs, analyses can be conducted to compare programs that determine eligibility via self-diagnoses versus physician diagnosis. Our review of the literature revealed that in general, a critical difference between the CDSMP and the EPP is that patients who participate in the CDSMP generally have a physician-diagnosed chronic condition. In the United Kingdom, where the EPP is based on social inclusion and patient empowerment, access to the program is not based on medical diagnoses but on self-defined long-term conditions (Kennedy, et al., 2007)

The majority of the studies reviewed reported program effects on samples that were predominately white and female; however, a few studies explicitly targeted Hispanic or African-American populations (Gitlin, et al., 2008; K. Lorig, et al., 2003; Powers, et al., 2009). Similar to the results of the CDSMP among white samples, studies targeting Hispanic and African American participants revealed significant program effects. Rose and colleagues (Rose, et al., 2008) noted that the CDSMP was feasible and well-received with the older African American adults but also noted that they may benefit from a “booster” session to assure lasting programmatic effects in an older adult population.

Beneficiary type was left largely vague by most studies. Notable exceptions are Rosenman et al.’s (2006) review that specified Medicaid beneficiaries, and studies that reported on managed care organization beneficiaries (Ahmed & Villagra, 2006; Jerant, et al., 2009; K. Lorig, et al., 2001). And finally, nearly all articles reviewed dealt with self-management programs in community settings. Armstrong et al. (2008) and Lorig et al. (2006) described positive outcomes of an internet-based self-managed program.

## **6. Summary and Implications for CDSMP Evaluation Design**

The purpose of this literature review was to inform the design of an evaluation study to assess the efficacy of the Stanford University CDSMP in AoA funded sites. The data gathered through this review has provided logistic and methodological insight that will help the design team to narrow the focus of the design and strengthen the potential for significant, relevant findings regarding participant improvement in health status and health behaviors, and in reducing healthcare utilization and costs.

Overall, the studies reviewed for this report provide evidence supporting the utility of the CDSMP and similar self-management programs in improving self-efficacy, health status, and health behaviors. In addition, while relatively few studies investigated the effects on health care utilization, those that did found significant reductions in physician visits and hospital stay duration, suggesting that savings to health care financing programs such as Medicare may be possible.

### **6.1 Design Implications**

Among the RCTs included in this review, the most common approach for evaluating the CDSMP was through a post-baseline, blinded randomization strategy, in which participants were recruited, completed baseline data collection, and were randomized into treatment and control groups. To avoid ethical implications of withholding what is considered to be a beneficial intervention, control group participants were placed on waiting lists, and received the intervention after the study period had



ended. Some studies collected follow-up data on wait-listed participants, to further examine changes in outcomes from baseline to post-intervention timeframes (K. Lorig, et al., 2001). ***Given the ethical concerns, we recommend that AoA evaluate the CDSMP using a RCT-type design with a waitlist control group and blind randomization.***

The most common data collection intervals used in these studies were four to six months post-intervention, and 12 months post-intervention; many of the RCTs reviewed collected data at least two times, and some extended the data collection period to two years post-intervention (K. Lorig, et al., 2001; Powers, et al., 2009). In these designs, average attrition rates ranged from 21 to 51 percent, depending upon the data collection interval, with common reasons for drop-out including illness, disinterest, and incorrect contact information. ***To maintain adequate sample for statistical power during the national CDSMP evaluation, we recommend that AoA adopt a recruitment/sampling strategy that accounts for attrition and utilizes these and other RCT studies to appropriately estimate and control for sample attrition.***

Based on the review of literature of both randomized and non-randomized trials, positive outcomes were reported in CDSMP studies regardless of design method, suggesting that an evaluation conducted by the AoA could find similar positive health outcomes in a longitudinal study. ***However, the reviewed studies vary enough in health outcome findings and in the length of follow-up data collection to suggest that the national CDSMP evaluation take care to include at least a 12-month post-intervention period to determine the sustainability of the outcomes measured.***

Data collection methodologies in most CDSMP studies focused almost exclusively on participant self-report, via mail survey questionnaires or telephone surveys. Instruments for assessing health status were developed for use in these studies (e.g., the modified Health Assessment Questionnaire physical disabilities scale (K. Lorig et al., 1996), the Health Education Impact Questionnaire (Osborne, Elsworth, & Whitfield, 2007), the Lorig Health Behavior Scale ((Osborne, et al., 2007)) and found to have good psychometric properties. These instruments and data collection methodology have made important contributions to our understanding of participant-centered program outcomes; however, in order to more fully understand the affect of these programs on health services utilization and public/private payor health care expenditures, additional datasets should be explored for the national evaluation. ***We recommend that AoA's evaluation contractor use validated instruments for participant self-report, supplemented by administrative claims and/or uniformly available health assessment data, to allow study of broader sets of outcome measures.***

## **6.2 Outcomes of Interest**

Four of the original Stanford CDSMP measures were most commonly used in the studies reviewed: health behavior, health status, health care utilization and self-efficacy. The original studies developed and validated instruments and scales for assessing these metrics, and additional measures have been developed and validated since, as described above. There is evidence that CDSMP improves ratings of self-reported health and increases self-efficacy and health-related QOL, but these findings vary by study and depending upon follow-up period. Some studies report decreases in health services utilization (i.e. inpatient hospital use) and potentially reduced costs for CDSMP participants; however, these studies have several limitations including the reliance on participant self-report.

***Based upon these reviewed studies, as well as upon AoA's stated purposes for designing a national evaluation of the CDSMP, we recommend that the following outcomes be compared for CDSMP treatment and control participants, using a mixed methods approach to data collection and analysis:***

- ***Health status (e.g., functioning, fatigue, social/role activity limitations), measured using both validated self-report instruments and independent clinical assessments;***
- ***Health behaviors (e.g., communication with physician) using validated self-report instruments;***
- ***Health care utilization (e.g., physician visits, inpatient hospital stays, emergency department use); and***
- ***Health care expenditures (e.g., costs to Medicare, Medicaid, other payors and out-of-pocket individual participants).***

### **6.3 Program Characteristics to Consider**

Many studies reviewed captured and analyzed participant demographic variables such as age, sex, and race/ethnicity to determine program effects. Though most studies reviewed sampled white and female CDSMP participants, several studies specifically targeted Hispanic participants (two studies) and rural African American older adults (one study). Similarly, most studies report age as a sample descriptor, rather than age in relation to outcomes. ***Given AoA's interest in understanding program effectiveness (including cost effectiveness) among elders, we recommend that the national evaluation specifically target elder (defined as 60-plus, per AoA guidance) CDSMP participants with broad cultural representation in order to demonstrate program effectiveness.***

Findings are mixed with regard to whether disease-specific or generic CDSMP programs result in better outcomes for participants. ***Given these mixed results, we recommend that AoA's national evaluation contractor consider sampling both types of programs for study.***

Finally, given that most reviewed studies focused on health outcomes rather than cost or utilization outcomes, types of beneficiaries by payor source were not a targeted group for sampling or for analysis. ***Again, given AoA's interest in understanding cost effectiveness for elders, we recommend that the national evaluation specifically target Medicare (and perhaps Medicaid) beneficiaries for study.***



## References

\*References marked with an asterisk indicate studies included in Key Article Review Table (Appendix A).

- \*Ahmed, T., & Villagra, V. (2006). Disease management programs: program intervention, behavior modification, and dosage effect. *Journal of Consumer Policy*, 29(3), 263-278.
- American Recovery and Reinvestment Act: Communities Putting Prevention to Work, Chronic Disease Self-Management Program. (2010). (January 2010). Retrieved from <http://www.aoa.gov/AoARoot/Grants/Funding/docs/2010/FINAL%20ARRA%20CDSMP%20RESOURC%20CENTER%20Program%20Announcement%201-12-10.pdf>
- \*Armstrong, N., & Powell, J. (2008). Preliminary test of an Internet-based diabetes self-management tool. [Article]. *Journal of Telemedicine & Telecare*, 14(3), 114-116.
- Arora, R., Boehm, J., Chimento, L., Moldawer, L., & Tsien, C. (2008). Designing and Implementing Medicaid Disease and Care Management Programs: A User's Guide. Retrieved 22 September 2010, from Agency for Healthcare Research and Quality: <http://www.ahrq.gov/qual/medicaidmgmt/medicaidmgmt.pdf>
- Arora, R., Boehm, J. et al. (2008) *Designing and Implementing Medicaid Disease and Care Management Programs: A User's Guide*. AHRQ Publication No. 07(08)-0063, March 2008, Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/qual/medicaidmgmt/>
- Arthritis Integrated Dissemination State Descriptions. Retrieved from <http://www.chronicdisease.org/files/public/ArthritisIntegratedDisseminationStateDescriptions.pdf>.
- Backman, L., & Almkvist, O. (1997). Brain activation in young and older adults during implicit and explicit retrieval. [Article]. *Journal of Cognitive Neuroscience*, 9(3), 376.
- \*Barlow, J., Turner, A., Edwards, R., & Gilchrist, M. (2009). A randomised controlled trial of lay-led self-management for people with multiple sclerosis. [Article]. *Patient Education & Counseling*, 77(1), 81-89.
- \*Barlow, J., Wright, C. C., Turner, A. P., & Bancroft, G. V. (2005). A 12-month follow-up study of self-management training for people with chronic disease: are changes maintained over time? *British Journal Of Health Psychology*, 10(Pt 4), 589-599.
- \*Battersby, M., Hoffmann, S., Cadilhac, D., Osborne, R., Lalor, E., & Lindley, R. (2009). 'Getting your life back on track after stroke': a Phase II multi-centered, single-blind, randomized, controlled trial of the Stroke Self-Management Program vs. the Stanford Chronic Condition Self-Management Program or standard care in. [Article]. *International Journal of Stroke*, 4(2), 137-144.
- \*Beckmann, K., Strassnick, K., Abel, L., Hermann, J., & Oakley, B. (2007). Is a Chronic Disease Self-Management Program Beneficial to People Affected by Cancer? [Article]. *Australian Journal of Primary Health*, 13(1), 36-44.
- \*Bedell, G. (2008). Balancing health, work, and daily life: Design and evaluation of a pilot intervention for persons with HIV/AIDS. [Article]. *Work*, 31(2), 131-144.
- Business Wire. (2003). State of Florida and LifeMasters Extend Medicaid Disease-Management Program that Improves Health, Lowers Costs. *FindArticles.com*. Retrieved 15 Sept, 2010 from [http://findarticles.com/p/articles/mi\\_m0EIN/is\\_2003\\_Nov\\_12/ai\\_n27674865/](http://findarticles.com/p/articles/mi_m0EIN/is_2003_Nov_12/ai_n27674865/)
- \*Chodosh, J., Morton, S. C., Mojica, W., Maglione, M., Suttrop, M. J., Hilton, L., et al. (2005). Chronic Disease Self-Management Programs for Older Adults. [Article]. *Annals of Internal Medicine*, 143(6), 132-132.
- Counsell, S. R. (2010). Team Developed Care Plan and Ongoing Care Management by Social Workers and Nurse Practitioners Results in Better Outcomes and Fewer Emergency Department Visits for Low-Income Seniors. Retrieved from <http://www.innovations.ahrq.gov/content.aspx?id=2066>

- \*Cummings, E., & Turner, P. (2009). Patient self-management and chronic illness: evaluating outcomes and impacts of information technology. *Studies In Health Technology And Informatics*, 143, 229-234.
- \*Damush, T. M., Jackson, G. L., Powers, B. J., Bosworth, H. B., Cheng, E., Anderson, J., et al. (2010). Implementing Evidence-Based Patient Self-Management Programs in the Veterans Health Administration: Perspectives on Delivery System Design Considerations. [Article]. *JGIM: Journal of General Internal Medicine*, 25, 68-71.
- Agency for Healthcare Research and Quality. (2010) *Designing and Implementing Medicaid Disease and Care Management Programs*. Retrieved from <http://www.ahrq.gov/qual/medicaidmgmt/medicaidmgmt4.htm>.
- \*Du, S., & Yuan, C. (2010). Evaluation of patient self-management outcomes in health care: a systematic review. [Article]. *International Nursing Review*, 57(2), 159-167.
- Edlin, M. (2006). Opening Doors on Disease Management. *American's Health Insurance Plans (AHIP)*. Retrieved 15 Sept 2010 from <http://www.ahip.org/content/default.aspx?bc=31|130|136|17340|17341>
- \*Ersek, M., Turner, J. A., Cain, K. C., & Kemp, C. A. (2008). Results of a randomized controlled trial to examine the efficacy of a chronic pain self-management group for older adults [ISRCTN11899548]. [Article]. *Pain (03043959)*, 138(1), 29-40.
- \*Foster, G., Taylor SJC, Eldridge S, Ramsay J, Griffiths CJ (2009). Self-management education programmes by lay leaders for people with chronic conditions (Review). *The Cochrane Library*(1), 1-77.
- Galston, S. K. (2009). Self-Management Programs: One Way to Promote Healthy Aging. *Public Health Reports*, 124, 478-480.
- \*Gitlin, L. N., Chernett, N. L., Harris, L. F., Palmer, D., Hopkins, P., & Dennis, M. P. (2008). Harvest Health: Translation of the Chronic Disease Self-Management Program for Older African Americans in a Senior Setting. [Article]. *Gerontologist*, 48(5), 698-705.
- Glasgow, R. E., Fisher, L., Skaff, M., Mullan, J., & Toobert, D. J. (2007). Problem Solving and Diabetes Self-Management. [Article]. *Diabetes Care*, 30(1), 33-37.
- Goehring, C. (2010). Fact Sheet: Chronic Disease Self-Management Program. Retrieved from [www.adsa.dshs.wa.gov](http://www.adsa.dshs.wa.gov)
- \*Goeppinger, J., Armstrong, B., Schwartz, T., Ensley, D., & Brady, T. J. (2007). Self-management education for persons with arthritis: Managing comorbidity and eliminating health disparities. *Arthritis And Rheumatism*, 57(6), 1081-1088.
- \*Gordon, C. a. T. G. (2008). Review of Findings on Chronic Disease Self-Management Program (CDSMP) Outcomes: Physical, Emotional & Health-Related Quality of Life, Healthcare Utilization and Costs. 1-10.
- \*Haas, M., Group, E., Muench, J., Kraemer, D., Brummel-Smith, K., Sharma, R., et al. (2005). Chronic disease self-management program for low back pain in the elderly. *Journal Of Manipulative And Physiological Therapeutics*, 28(4), 228-237.
- \*Heisler, M. (2010). Different models to mobilize peer support to improve diabetes self-management and clinical outcomes: evidence, logistics, evaluation considerations and needs for future research. [Article]. *Family Practice*, 27(suppl), i23-i32.
- \*Jerant, A., Moore-Hill, M., & Franks, P. (2009). Home-based, peer-led chronic illness self-management training: findings from a 1-year randomized controlled trial. *Annals Of Family Medicine*, 7(4), 319-327.
- \*Johnson, P., & Raterink, G. (2009). Implementation of a diabetes clinic-in-a-clinic project in a family practice setting: using the plan, do, study, act model. [Article]. *Journal of Clinical Nursing*, 18(14), 2096-2103.

- \*Kendall, E., Catalano, T., Kuipers, P., Posner, N., Buys, N., & Charker, J. (2007). Recovery following stroke: The role of self-management education. [Article]. *Social Science & Medicine*, 64(3), 735-746.
- \*Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., Richardson, G., et al. (2007). The effectiveness and cost effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial. *Journal Of Epidemiology And Community Health*, 61(3), 254-261.
- \*Lorig, K., Hurwicz, M.-L., Sobel, D., Hobbs, M., & Ritter, P. L. (2005). A national dissemination of an evidence-based self-management program: a process evaluation study. [Article]. *Patient Education & Counseling*, 59(1), 69-79.
- \*Lorig, K., Ritter, P., Stewart, A. L., Sobel, D. S., Brown, B. W., Jr., Bandura, A., et al. (2001). Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Medical Care*, 39(11), 1217-1223.
- \*Lorig, K., Ritter, P. L., Dost, A., Plant, K., Laurent, D. D., & McNeil, I. (2008). The Expert Patients Programme online, a 1-year study of an Internet-based self-management programme for people with long-term conditions. *Chronic Illness*, 4(4), 247-256.
- \*Lorig, K., Ritter, P. L., & González, V. M. (2003). Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nursing Research*, 52(6), 361-369.
- \*Lorig, K., Ritter, P. L., & Jacquez, A. (2005). Outcomes of border health Spanish/English chronic disease self-management programs. *The Diabetes Educator*, 31(3), 401-409.
- \*Lorig, K., Ritter, P. L., Laurent, D. D., & Plant, K. (2006). Internet-based chronic disease self-management: a randomized trial. *Medical Care*, 44(11), 964-971.
- \*Lorig, K., Ritter, P. L., & Plant, K. (2005). A disease-specific self-help program compared with a generalized chronic disease self-help program for arthritis patients. *Arthritis And Rheumatism*, 53(6), 950-957.
- \*Lorig, K., Sobel, D. S., Stewart, A. L., Brown, B. W., Jr., Bandura, A., Ritter, P., et al. (1999). Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Medical Care*, 37(1), 5-14.
- Lorig, K., Stewart, A., Ritter, P., Gonzalez, V., Laurent, D., & Lynch, J. (1996). *Outcome measures for health education and other health care interventions*. Thousand Oaks, CA: Sage Publications, Inc.
- \*Lorig, K. R., Sobel, D. S., Ritter, P. L., Laurent, D., & Hobbs, M. (2001). Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice: ECP*, 4(6), 256-262.
- National Evaluation of the Sharing Health Care Initiative: Final Technical Report. (2005). Retrieved from [http://www.health.gov.au/internet/main/publishing.nsf/Content/B71197DF35CE8CD3CA2570BC00818001/\\$File/FINAL%20SHCI%20Technical%20Report.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/B71197DF35CE8CD3CA2570BC00818001/$File/FINAL%20SHCI%20Technical%20Report.pdf)
- \*Nolte, S., Elsworth, G. R., Sinclair, A. J., & Osborne, R. H. (2007). The extent and breadth of benefits from participating in chronic disease self-management courses: A national patient-reported outcomes survey. [Article]. *Patient Education & Counseling*, 65(3), 351-360.
- \*Osborne, R. H., Elsworth, G. R., & Whitfield, K. (2007). The Health Education Impact Questionnaire (heiQ): An outcomes and evaluation measure for patient education and self-management interventions for people with chronic conditions. [Article]. *Patient Education & Counseling*, 66(2), 192-201.
- \*Powers, B. J., Olsen, M. K., Oddone, E. Z., & Bosworth, H. B. (2009). The Effect of a Hypertension Self-Management Intervention on Diabetes and Cholesterol Control. [Article]. *American Journal of Medicine*, 122(7), 639-646.
- \*Richardson, G., Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., et al. (2008). Cost effectiveness of the Expert Patients Programme (EPP) for patients with chronic conditions. [Article]. *Journal of Epidemiology & Community Health*, 62(4), 361-367.

- \*Rogers, A., Kennedy, A., Bower, P., Gardner, C., Gately, C., Lee, V., et al. (2008). The United Kingdom Expert Patients Programme: results and implications from a national evaluation. *The Medical Journal Of Australia*, 189(10 Suppl), S21-S24.
- \*Rogers, A., Kennedy, A., Nelson, E., & Robinson, A. (2005). Uncovering the Limits of Patient-Centeredness: Implementing a Self-Management Trial for Chronic Illness. [Article]. *Qualitative Health Research*, 15(2), 224-239.
- \*Rose, M. A., Arenson, C., Harrod, P., Salkey, R., Santana, A., & Diamond, J. (2008). Evaluation of the Chronic Disease Self-Management Program With Low-Income, Urban, African American Older Adults. [Article]. *Journal of Community Health Nursing*, 25(4), 193-202.
- \*Rosenman, M. B., Holmes, A. M., Ackermann, R. T., Murray, M. D., Doebbeling, C. C., Katz, B., et al. (2006). The Indiana Chronic Disease Management Program. [Article]. *Milbank Quarterly*, 84(1), 135-163.
- \*Sequist, T. D., von Glahn, T., Li, A., Rogers, W. H., & Safran, D. G. (2009). Statewide evaluation of measuring physician delivery of self-management support in chronic disease care. *Journal Of General Internal Medicine*, 24(8), 939-945.
- \*Smeulders, E. S. T. F., van Haastregt, J. C. M., Ambergen, T., Janssen-Boyne, J. J. J., van Eijk, J. T. M., & Kempen, G. I. J. M. (2009). The impact of a self-management group programme on health behaviour and healthcare utilization among congestive heart failure patients. *European Journal Of Heart Failure: Journal Of The Working Group On Heart Failure Of The European Society Of Cardiology*, 11(6), 609-616.
- \*Sobel, D. S., Kate R Lorig, Mary Hobbs (2002). Chronic Disease Self-Management Program: From Development to Dissemination. *The Permanente Journal*, 6(2), 15-22.
- \*Swerissen, H., Belfrage, J., Weeks, A., Jordan, L., Walker, C., Furler, J., et al. (2006). A randomised control trial of a self-management program for people with a chronic illness from Vietnamese, Chinese, Italian and Greek backgrounds. *Patient Education And Counseling*, 64(1-3), 360-368.
- Tilly, J. (2010). The Administration on Aging's Experiences with Health, Prevention, and Wellness. *Generations*(Spring 2010).
- \*Young, A. S., Chaney, E., Shoai, R., Bonner, L., Cohen, A. N., Doebbeling, B., et al. (2007). Information Technology to Support Improved Care For Chronic Illness. [Article]. *JGIM: Journal of General Internal Medicine*, 22, 425-430.

## Description of the Appendices

---

**Appendices A, B, C, & D** were used as tools to develop implications for the evaluation design from the literature review.

**Appendix A** is the Articles included in Review of the Literature table. It provides a summary of the 44 articles examined for the literature review.

**Appendix B** includes data extraction tables for the 25 quantitative peer-reviewed CDSMP articles. A 'one-page snap shot' was created of articles from the Key Article Review table that included quantitative data related to CDSMP evaluation. The key findings from each article are included in each of these tables. The 26<sup>th</sup> table is a mixed methods study of the use of a technology tool.

**Appendix C** is an additional extraction and companion to the data extraction tables. The table includes information on fidelity to Stanford CDSMP, randomization notes, site information, screening, and country/region of CDSMP.

**Appendix D** describes, when available, program modifications to the traditional Stanford CDSMP program. The table gives a sense of the degree of fidelity to the Stanford model.

## **Appendix A.**

### **Articles Included in Review of the Literature**

---



Article #	Country Code	Citation	Study Design	Program	Mode of Intervention	Sample Characteristics	Data Collection	Key Findings
1	USA	Ahmed, T., & Villagra, V. (2006). Disease management programs: program intervention, behavior modification, and dosage effect. [Article]. Journal of Consumer Policy, 29(3), 263-278.	Pre-post design; matched concurrent comparison	Diabetes Disease Management Program (DDMP)	Telephone-based	Diabetes-specific Pre-post n = 43,492 Matched group n = 39,292	Administrative records review	Patients with access to DDMP experience better quality of care as indicated by HEDIS measures. Longer participation is also associated with incremental improvements in HEDIS metrics in four of six indicators, arguing for interventions that last at least six months. The study also suggests that overall cost of care can be reduced for managed care plan members who participate in DDMP programs, although increases in pharmacy and other services occurred.
2	UK	Armstrong, N., & Powell, J. (2008). Preliminary test of an Internet-based diabetes self-management tool. [Article]. Journal of Telemedicine & Telecare, 14(3), 114-116.	Focus group	Virtual Clinic for diabetes self management	Internet-based	Diabetes-specific N=5	Focus group	Including a variety of information sources and effectively organizing content may be important keys to success for internet-based diabetes self-management programs.
3	UK	Barlow, J., Turner, A., Edwards, R., & Gilchrist, M. (2009). A randomised controlled trial of lay-led self-management for people with multiple sclerosis. [Article]. Patient Education & Counseling, 77(1), 81-89.	RCT	CDSMP	Community-based	Multiple sclerosis-specific Treatment n = 78 Wait-list control n = 64 Comparison n = 74	Mailed questionnaires	CDSMP had a significant impact on self-efficacy and physical status, with trend towards improvement in depression.
4	UK	Barlow, J., Wright, C. C., Turner, A. P., & Bancroft, G. V. (2005). A 12-month follow-up study of self-management training for people with chronic disease: are changes maintained over time? British Journal Of Health Psychology, 10(Pt 4), 589-599.	Pre-post design	CDSMP	Community-based	n = 171	Mailed questionnaires; Telephone follow-up with subsample	Significant improvements were found from baseline to 4-month follow-up on self-efficacy, cognitive symptom management, physician communication, fatigue, anxious and depressed mood, and health distress. No significant changes were found between 4- and 12-month follow-ups osuggesting that the improvements noted on these variables at 4-months were maintained in the longer-term.
5	Australia	Battersby, M., Hoffmann, S., Cadilhac, D., Osborne, R., Lalor, E., & Lindley, R. (2009). 'Getting your life back on track after stroke': a Phase II multi-centered, single-blind, randomized, controlled trial of the Stroke Self-Management Program vs. the Stanford Chronic Condition Self-Management Program or standard care in. [Article]. International Journal of Stroke, 4(2) 137-144	RCT protocol report	CDSMP and Stroke Self-Management Program	Community-based	Stroke-survivorship	Mailed questionnaires	None to report. Publication describes RCT design protocol.
6	Australia	Beckmann, K., Strassnick, K., Abel, L., Hermann, J., & Oakley, B. (2007). Is a Chronic Disease Self-Management Program Beneficial to People Affected by Cancer? [Article]. Australian Journal of Primary Health, 13(1), 36-44.	Qualitative interview	CDSMP and Cancer Self-Management Program	Community-based	Cancer-survivorship Generic CDSMP n = 10 Cancer-specific n = 25	Telephone interviews	This study suggests the CDSMP is an acceptable model for people affected by cancer (patients and caregivers) to help them manage psychological and physical impacts of having had cancer. Findings suggest a disease-specific model is preferable to a generic model, and also suggest that information targeted to carers may need to be further developed to meet their needs.
7	USA	Bedell, G. (2008). Balancing health, work, and daily life: Design and evaluation of a pilot intervention for persons with HIV/AIDS. [Article]. Work, 31(2), 131-144.	Pre-post design	Self-management and work skills for persons with HIV/AIDS	Community-based	HIV/AIDS-specific n = 53	In-person and telephone interviews	Findings suggest that an HIV/AIDS-specific intervention geared toward self-management and work transition skills is positively associated with percieved ability to work, and may also be associated with improvements in health and work outcomes.
8	n/a	Chodosh, J., Morton, S. C., Mojica, W., Maglione, M., Suttorp, M. J., Hilton, L., et al. (2005). Chronic Disease Self-Management Programs for Older Adults. [Article]. Annals of Internal Medicine, 143(6), I32-I32.	Meta-analysis	CDSMP and other self-management programs targeting chronic conditions	n/a	53 studies included in the analysis	n/a	This meta-analysis suggests that diabetes mellitus and hypertension specfic self management programs are likely to yield beneficial effects. This does not appear to be true for osteoarthritis specific programs. The study could not determine the most essential components of a self-management program, although findings suggest that providing feedback to participants might be an important component.
9	Australia	Cummings, E., & Turner, P. (2009). Patient self-management and chronic illness: evaluating outcomes and impacts of information technology. Studies In Health Technology And Informatics, 143, 229-234.	Mixed methods design with a subsample of an RCT	COPD self-management program	Telephone-based	COPD-specific n = 12	Diary-keeping and questionnaire	Participants who did not utilize the information-technology (IT) component of the study reported greater improvements than IT users; IT users were also found to have an increase of depression.
10	USA	Damush, T. M., Jackson, G. L., Powers, B. J., Bosworth, H. B., Cheng, E., Anderson, J., et al. (2010). Implementing Evidence-Based Patient Self-Management Programs in the Veterans Health Administration: Perspectives on Delivery System Design Considerations. [Article]. JGIM: Journal of General Internal Medicine, 25, 68-71.	Implementation report	Hypertension and stroke self-management programs	n/a	Hyptertension and/or stroke-survivorship	n/a	Benefits of self-management programs may extend beyond the disease/condition of interest; e.g., a hypertension program also helped participants improve glycemic control Leadership and support tools are important components of an intervention that may influence its success; in addition, intervention format may affect its reach into the targeted recipient population.

Article #	Country Code	Citation	Study Design	Program	Mode of Intervention	Sample Characteristics	Data Collection	Key Findings
11	n/a	Du, S., & Yuan, C. (2010). Evaluation of patient self-management outcomes in health care: a systematic review. [Article]. International Nursing Review, 57(2), 159-167.	Systematic review	CDSMP and other self-management programs targeting chronic conditions	n/a	19 studies reviewed	n/a	This systematic review showed that, among articles reporting on results of RCTs examining self-management programs, the most common outcome measures used are self-efficacy, health behaviors/attitudes, health status, health care utilization, quality of life, and psychological indicators (particularly depression).
12	USA	Ersek, M., Turner, J. A., Cain, K. C., & Kemp, C. A. (2008). Results of a randomized controlled trial to examine the efficacy of a chronic pain self-management group for older adults [ISRCTN11899548]. [Article]. Pain (03043959), 138(1), 29-40.	RCT	Pain self-management program	Community-based	Older adults Chronic-pain specific Treatment n = 115 Control n = 103	Administered questionnaire	No significant differences in outcomes were found between groups at post-intervention, 6-month follow-up, or 12-month follow-up. The self-management group showed a significantly greater increase over time, relative to the control group, in two process measures, as measured by the Chronic Pain Coping Inventory: use of relaxation and use of exercise/stretching.
13	n/a	Foster, G., Taylor SJ, Eldridge S, Ramsay J, Griffiths CJ. (2009). Self-management education programmes by lay leaders for people with chronic conditions (Review). The Cochrane Library(1), 1-77.	Systematic review	CDSMP and other self-management programs targeting chronic conditions	n/a	17 clinical trials reviewed	n/a	Lay-led self-management education programs may lead to small, short-term improvements in participants' self-efficacy, self-rated health, cognitive symptoms management, and frequency of aerobic exercise. There is currently no evidence to suggest that such programs improve psychological health, symptoms or health-related quality of life, or that they significantly alter healthcare use. Future research on such interventions should explore longer term outcomes, their effect on clinical measure of disease and their potential role in children and adolescents.
14	USA	Gitlin, L. N., Chernett, N. L., Harris, L. F., Palmer, D., Hopkins, P., & Dennis, M. P. (2008). Harvest Health: Translation of the Chronic Disease Self-Management Program for Older African Americans in a Senior Setting. [Article]. Gerontologist, 48(5), 698-705.	Pre-post design	CDSMP	Community-based	African-American 65+ n = 414	Assessment interviews	Small but statistically significant improvements were found for health behaviors, self-efficacy, and health outcomes, but no changes were found for health utilization. Participant benefits compare favorably to original trial outcomes. The translated program is replicable and may help to address health disparities.
15	USA	Goeppinger, J., Armstrong, B., Schwartz, T., Ensley, D., & Brady, T. J. (2007). Self-management education for persons with arthritis: Managing comorbidity and eliminating health disparities. Arthritis And Rheumatism, 57(6), 1081-1088.	RCT	CDSMP and Arthritis-specific CDSMP	Community-based	Oversample of african-americans Arthritis-specific CDSMP n = 185 Arthritis-specific n = 231	Mailed questionnaire	At 4 months all ASHC participants had significant improvements in self-efficacy, health behaviors, and general health. All CDSMP participants had statistically significant improvements in self-efficacy, disability, pain, and general health. African American CDSMP participants showed statistically significant improvements in general health. Statistically significant differences between the programs at 4 months were seen in pain and disability in both groups. The CDSMP produced stronger results. No significant results were found for health care utilization outcomes. Significant results at 1 year within and between programs were minimal for both groups; a decrease in number of physician visits approached significance due to changes in CDSMP participants.
16	n/a	Gordon, C. a. T. G. (2008). Review of Findings on Chronic Disease Self-Management Program (CDSMP) Outcomes: Physical, Emotional & Health-Related Quality of Life, Healthcare Utilization and Costs. 1-10.	Systematic review	CDSMP	n/a	13 studies reviewed	n/a	CDSMP results in significant, measureable improvements in patient outcomes and quality of life. CDSMP also saves enough through reductions in healthcare expenditures to pay for itself within first year.
17	USA	Haas, M., Group, E., Muench, J., Kraemer, D., Brummel-Smith, K., Sharma, R., et al. (2005). Chronic disease self-management program for low back pain in the elderly. Journal Of Manipulative And Physiological Therapeutics, 28(4), 228-237.	RCT	CDSMP	Community-based	Age 60+ Chronic low back pain-specific Treatment n = 60 Control n = 49	Mailed questionnaire	There was no advantage for the CDSMP over a wait-list control for improving pain, general health, self-efficacy and self-care attitudes in older Americans with chronic low back pain. A benefit was suggested for emotional well-being fatigue, functional disability, and days with disability.
18	n/a	Heisler, M. (2010). Different models to mobilize peer support to improve diabetes self-management and clinical outcomes: evidence, logistics, evaluation considerations and needs for future research. [Article]. Family Practice, 27(suppl), i23-i32.	Background paper on implementation and evaluation of self-management programs	Diabetes self-management programs	n/a	n/a	n/a	To be successful, peer support interventions should have clear and realistic program goals, adequate training and support for peers and sufficient overall organizational support for the program. Peer support models provide a potentially low-cost, flexible means to supplement formal health care support. Peer support models also potentially benefit both those 'receiving' the support and those 'providing' it.



Article #	Country Code	Citation	Study Design	Program	Mode of Intervention	Sample Characteristics	Data Collection	Key Findings
19	USA	Jerant, A., Moore-Hill, M., & Franks, P. (2009). Home-based, peer-led chronic illness self-management training: findings from a 1-year randomized controlled trial. <i>Annals Of Family Medicine</i> , 7(4), 319-327.	RCT	Home delivered - CDSMP	Home-based	In-home n = 138 Telephone n = 139 Control n = 138	Telephone and in-person questionnaire	Treatment group participants had significantly higher self-efficacy in the short term, but this was not sustained at one year. No effects were found on utilization. This study challenges the cost-effectiveness of home-based variations of the CDSMP.
20	USA	Johnson, P., & Raterink, G. (2009). Implementation of a diabetes clinic-in-a-clinic project in a family practice setting: using the plan, do, study, act model. [Article]. <i>Journal of Clinical Nursing</i> , 18(14), 2096-2103.	Implementation report	Diabetes self-management program	Clinic-based	n/a	n/a	This report describes the process of implementing a "clinic-within-clinic" model of chronic disease management for diabetics, using the "plan-do-study-act" process model.
21	Australia	Kendall, E., Catalano, T., Kuipers, P., Posner, N., Buys, N., & Charker, J. (2007). Recovery following stroke: The role of self-management education. [Article]. <i>Social Science &amp; Medicine</i> , 64(3), 735-746.	RCT	CDSMP	Community-based	Stroke-survivorship Treatment n = 58 Control n = 42	Telephone questionnaire	No signficiant improvements in self-efficacy, mood, or social participation were found. However, among the control group, declines in functioning during the first year following stroke were found in the areas of family roles, activities of daily living, self-care and work productivity; these declines were not found for the treatment group. This suggests the CDSMP may have a protective function.
22	UK	Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., Richardson, G., et al. (2007). The effectiveness and cost effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial. <i>Journal Of Epidemiology And Community Health</i> , 61(3), 254-261.	RCT	Expert Patients Programme	Community-based	Treatment n = 313 Control n = 316	Mailed questionnaire	This study found higher scores for overall self-efficacy and energy among the treatment group, but no differences were reported in healthcare utilization. On secondary outcomes, fewer social role limitations, better pyschological wellbeing, lower health stress, more exercise and relaxation, etc. were reported. Intervention groups were associated with better QALY profile as well as a small reduction in cost (\$53).
23	USA	Lorig, K., Hurwicz, M.-L., Sobel, D., Hobbs, M., & Ritter, P. L. (2005). A national dissemination of an evidence-based self-management program: a process evaluation study. [Article]. <i>Patient Education &amp; Counseling</i> , 59(1), 69-79.	Process evaluation	CDSMP	Community-based	CDSMP program coordinators and leaders n = 516	Telephone interview	This study focused on attributes of CDSMP programs and administration that influenced success. Length of the CDSMP program was reported as a hindrance by the sites that were unsuccessful. Patient recruitment was largely sited as a problem by both successful and unsuccessful programs.
24	USA	Lorig, K., Ritter, P., Stewart, A. L., Sobel, D. S., Brown, B. W., Jr., Bandura, A., et al. (2001). Chronic disease self-management program: 2-year health status and health care utilization outcomes. <i>Medical Care</i> , 39(11), 1217-1223.	Pre-post design	CDSMP	Community-based	1-year follow-up n = 683 2-year follow-up n = 599	Mailed questionnaire	This study suggests that the CDSMP is associated with significant continued improvements in participant health status, and reductions in health care utilization over a 2-year follow-up period. Estimated potential actual health care savings were calculated between \$390 and \$520 (\$590 savings per participant, minus CDSMP program cost between \$70 and \$200 per participant).
25	UK	Lorig, K., Ritter, P. L., Dost, A., Plant, K., Laurent, D. D., & McNeil, I. (2008). The Expert Patients Programme online, a 1-year study of an Internet-based self-management programme for people with long-term conditions. <i>Chronic Illness</i> , 4(4), 247-256.	Pre-post design	Expert Patients Programme	Internet-based	6-month follow up n = 459 12-month follow up n = 443	Online questionnaire	At six-months, significant change was found for five of seven health indicators, and all four health behaviors measured. No significant change in disability or global health was found. At one-year, significant change in six of seven health indicators was found with disability showing no change. All four health behaviors were significantly improved, and healthcare utilization continued to show significant improvment. Significant improvement in self-efficacy was found, and this change predicted outcomes for each of the six health indicators.
26	USA	Lorig, K., Ritter, P. L., & González, V. M. (2003). Hispanic chronic disease self-management: a randomized community-based outcome trial. <i>Nursing Research</i> , 52(6), 361-369.	RCT	CDSMP	Community-based	Spanish-speaking Treatment n = 224 Control n = 271	Mailed and telephone questionnaire	At 4 months, greater improvement in health status, health behaviors, self-efficacy, health care utilization was found among treatment group participants. At 1 year, these improvement persisted.
27	USA & Mexico	Lorig, K., Ritter, P. L., & Jacquez, A. (2005). Outcomes of border health Spanish/English chronic disease self-management programs. <i>The Diabetes Educator</i> , 31(3), 401-409.	Pre-post design	CDSMP	Community-based	Spanish-speaking Mexicans and Americans n = 445	Mailed and telephone questionnaire	This study found significant improvements in health status, health behaviors, and self-efficacy among CDSMP participants at 4 months and 1 year post-intervention. Self-efficacy at baseline and 4 months was found to be significantly associated with improvements in outcomes at 1 year post-intervention.
28	USA	Lorig, K., Ritter, P. L., Laurent, D. D., & Plant, K. (2006). Internet-based chronic disease self-management: a randomized trial. <i>Medical Care</i> , 44(11), 964-971.	RCT	CDSMP	Internet-based	Internet users Treatment n = 457 Control n = 501	Online questionnaire	Intervention-group participants in this study had significantly improved health status outcomes compared to usual treatment participants at 1 year post-intervention. Change in self-efficacy at 6 months was associated with more improved health status outcomes at 1 year.
29	USA	Lorig, K., Ritter, P. L., & Plant, K. (2005). A disease-specific self-help program compared with a generalized chronic disease self-help program for arthritis patients. <i>Arthritis And Rheumatism</i> , 53(6), 950-957.	RCT	CDSMP and Arthritis-specific CDSMP (ASMP)	Community-based	Arthritis-specific ASMP n = 239 CDSMP n = 116	Mailed questionnaire	At four months post-intervention, ASMP participants demonstrated greater improvement in health distress, activity limitation, and fatigue than CDSMP participants. At one year, participants had significantly higher improvment in global health and fatigue than CDSMP participants.

Article #	Country Code	Citation	Study Design	Program	Mode of Intervention	Sample Characteristics	Data Collection	Key Findings
30	USA	Lorig, K., Sobel, D. S., Stewart, A. L., Brown, B. W., Jr., Bandura, A., Ritter, P., et al. (1999). Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. Medical Care, 37(1), 5-14.	RCT	CDSMP	Community-based	Treatment n = 561 Control n = 391	Mailed questionnaire	In this study, treatment group participants showed significant improvement in duration of exercise, increased practice of cognitive symptom management, improved communication with physician, self-rated health, disability, social/role activities limitations, energy/fatigue, and health distress; in addition, fewer hospitalizations and shorter length of stay was also observed. Health care costs for control group members was calculated to be \$820 greater than health care costs for treatment group members.
31	USA	Lorig, K. R., Sobel, D. S., Ritter, P. L., Laurent, D., & Hobbs, M. (2001). Effect of a self-management program on patients with chronic disease. Effective Clinical Practice: ECP, 4(6), 256-262.	Pre-post design	CDSMP	Community-based	n = 489	Self-administered questionnaire	At 1 year, participants in the program experienced statistically significant improvements in health behaviors, self-efficacy, and health status and had fewer visits to the emergency department. Program costs were estimated to be about \$200 per participant.
32	Australia	Nolte, S., Elsworth, G. R., Sinclair, A. J., & Osborne, R. H. (2007). The extent and breadth of benefits from participating in chronic disease self-management courses: A national patient-reported outcomes survey. [Article]. Patient Education & Counseling, 65(3), 351-360.	Pre-post design	Self-management programs targeting chronic conditions	Community-based	n = 842	Self-administered questionnaire	Attendees of self-management programs in Australia experienced substantial improvements in skill and technique acquisition and self-monitoring and insight, as well as improvement in other health domains. It appeared that younger female participants may stand to gain the most benefit from such programs. Educational differences do not seem to impact the potential of experiencing improvements or decline.
33	Australia	Osborne, R. H., Elsworth, G. R., & Whitfield, K. (2007). The Health Education Impact Questionnaire (heiQ): An outcomes and evaluation measure for patient education and self-management interventions for people with chronic conditions. [Article]. Patient Education & Counseling, 66(2), 192-201.	Measure development	Evaluation tool for self-management programs	n/a	Calibration sample = 591 Validation sample = 598	Self-administered questionnaire	This paper reports the development and testing of the Health Education Impact Questionnaire (heiQ). Eight independent scales with very good or good psychometric properties were developed: Positive and Active Engagement in Life Health Directed Behavior Skill and Technique Acquisition Constructive Attitudes and Approaches Self Monitoring and Insight Health Services Navigation Social Integration and Support Emotional Wellbeing (reversed scale)
34	USA	Powers, B. J., Olsen, M. K., Oddone, E. Z., & Bosworth, H. B. (2009). The Effect of a Hypertension Self-Management Intervention on Diabetes and Cholesterol Control. [Article]. American Journal of Medicine, 122(7), 639-646.	RCT	Hypertension self-management program	Telephone-based	Diabetes study: Treatment n = 102 Control n = 117 Cholesterol study: Treatment n = 269 Control n = 259	Electronic medical record review	This study found significant effects of a hypertension self-management program on diabetes-related indicators, but not on cholesterol-related indicators. Findings suggest that self-management programs do have the potential to influence unintended outcomes, such as glycemic control.
35	UK	Richardson, G., Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., et al. (2008). Cost effectiveness of the Expert Patients Programme (EPP) for patients with chronic conditions. [Article]. Journal of Epidemiology & Community Health, 62(4), 361-367.	RCT	Expert Patients Programme	Community-based	Treatment n = 247 Control n = 273	Self-administered questionnaire	The findings of this study showed an association between treatment group and gains in quality adjusted life years, and a reduction in care costs of approximately £27 per patient.
36	UK	Rogers, A., Kennedy, A., Bower, P., Gardner, C., Gately, C., Lee, V., et al. (2008). The United Kingdom Expert Patients Programme: results and implications from a national evaluation. The Medical Journal Of Australia, 189(10 Suppl), S21-S24.	Evaluation report	Expert Patients Programme	Community-based	See Kennedy et al., 2007	See Kennedy et al., 2007	See Kennedy et al., 2007 for RCT results. This report suggests that the Expert Patients Programme is likely to be cost-effective, and may yeild benefits not measured by frequently-used evaluation tools, such as increased social networks.
37	UK	Rogers, A., Kennedy, A., Nelson, E., & Robinson, A. (2005). Uncovering the Limits of Patient-Centeredness: Implementing a Self-Management Trial for Chronic Illness. [Article]. Qualitative Health Research, 15(2), 224-239.	Qualitative interview with subsample of RCT participants	Expert Patients Programme	Community-based	Inflammatory bowel disease patients n = 28 Intervention consultants n = 11	Telephone and in-home qualitative interviews	Findings from this study suggest that a number of factors may inhibit effective patient-centered consultations in self-management programs, including failure of physicians to incorporate expressed need relevant to people's self-management activities fully, interpretation of self management as compliance with medical instructions, and the organization of outpatients' clinics.
38	USA	Rose, M. A., Arenson, C., Harrod, P., Salkey, R., Santana, A., & Diamond, J. (2008). Evaluation of the Chronic Disease Self-Management Program With Low-Income, Urban, African American Older Adults. [Article]. Journal of Community Health Nursing, 25(4), 193-202.	Pre-post design	CDSMP	Community-based	Low-income, urban, older African-Americans n = 68	Self-administered questionnaire	This study found significant improvements in some health status and health behaviors, but did not find significant improvement in self-efficacy or health care utilization.

Article #	Country Code	Citation	Study Design	Program	Mode of Intervention	Sample Characteristics	Data Collection	Key Findings
39	USA	Rosenman, M. B., Holmes, A. M., Ackermann, R. T., Murray, M. D., Doebbeling, C. C., Katz, B., et al. (2006). The Indiana Chronic Disease Management Program. [Article]. Milbank Quarterly, 84(1), 135-163.	Implementation report	Indiana CDSMP	Telephone-based	Adults from Indiana with diabetes or congestive heart failure	Administrative claims, electronic medical records system, telephone center logs, self-reported data from practices	This article describes a state-developed chronic disease management program, with telephonic intervention designed to stimulate self-care, encourage provision of core medical care, and offer educational resources. It also discusses considerations for the evaluation of the program.
40	USA	Sequist, T. D., von Glahn, T., Li, A., Rogers, W. H., & Safran, D. G. (2009). Statewide evaluation of measuring physician delivery of self-management support in chronic disease care. Journal Of General Internal Medicine, 24(8), 939-945.	Measurement validation	Measure of self-management support	n/a	Respondents to annual statewide patient survey with chronic disease n = 80,597	Mailed questionnaire	This study found that the new measure for self-management support was feasible and valid, with a minimum sample size required to reliably estimate support of 199. Scores for this measure were highest for patients with cancer, and lowest for patients with hypertension
41	The Netherlands	Smeulders, E. S. T. F., van Haastregt, J. C. M., Ambergen, T., Janssen-Boyne, J. J. J., van Eijk, J. T. M., & Kempen, G. I. J. M. (2009). The impact of a self-management group programme on health behaviour and healthcare utilization among congestive heart failure patients. European Journal Of Heart Failure: Journal Of The Working Group On Heart Failure Of The European Society Of Cardiology, 11(6), 609-616.	RCT	CDSMP	Community-based	Congestive heart failure-specific Treatment n = 131 Control n = 186	Telephone interview	Significant improvements in walking were found at immediate post-intervention follow-up but not at 6 or 12 months post-intervention. Significant change in other physical exercises was observed at direct follow-up and 6 months, but not one year. No significant change in drinking, smoking, body mass index, swimming, biking, health care utilization was found.
42	USA	Sobel, D. S., Kate R Lorig, Mary Hobbs. (2002). Chronic Disease Self-Management Program: From Development to Dissemination. The Permanente Journal, 6(2), 15-22.	Evaluation report	CDSMP	Community-based	n/a	Quantitative and qualitative methods	This report provides evidence that CDSMP, when integrated into patient care, can improve health outcomes for patients both medically and emotionally. Tools were replicated and successfully disseminated in other areas, and researchers noted that degree of leadership buy-in and support, and adequacy of infrastructure and staff can have a great affect on the program's success. Patients must also be successfully recruited by the organization and have an individual commitment to the program. In addition, recruitment into a generic CDSMP as compared to a disease-specific program led to competition with other programs and confusion among participants and physicians of the program's role. Longitudinal study results show that hospitalization and hospital stays decreased, saving an average of \$990 per participant in the first year (comparing cost of program to hospital costs).
43	Australia	Swerissen, H., Belfrage, J., Weeks, A., Jordan, L., Walker, C., Furler, J., et al. (2006). A randomised control trial of a self-management program for people with a chronic illness from Vietnamese, Chinese, Italian and Greek backgrounds. Patient Education And Counseling, 64(1-3), 360-368.	RCT	CDSMP	Community-based	Greek, Italian, Vietnamese, or Chinese- speaking Treatment n = 320 Control n = 154	In-person, mailed, and telephone questionnaire	This study demonstrated that the CDSMP can effectively be translated and implemented in a variety of languages in Australia. The intervention group had significantly higher levels of energy, exercised more frequently, used more cognitive symptom management techniques, and reported higher levels of self-efficacy and self-rated health compared to the control group. No significant differences were found in service use, and health outcomes and service use varied among language group.
44	USA	Young, A. S., Chaney, E., Shoai, R., Bonner, L., Cohen, A. N., Doebbeling, B., et al. (2007). Information Technology to Support Improved Care For Chronic Illness. [Article]. JGIM: Journal of General Internal Medicine, 22, 425-430.	Systematic review and expert panel	Chronic illness care	n/a	n/a	n/a	Researchers funded by the Department of Veteran Affairs performed a literature review, convened an expert panel, and created use cases for four chronic illnesses: depression, schizophrenia, diabetes, and comorbid disorders. Literature-- much of which was nonexperimental-- was used along with expert interviews to develop use cases for HIT management. The "recovery" model was seen as applicable to other chronic disorders. Automatic scoring algorithms were recommended for outcome-based quality improvement, as well as the use of EMRs that allow patients and physicians to track all phases of treatment. This gave focus to the use of HIT (EMRs or PHRs) as a specific tool in managing chronic illness, rather than a method by which to track it.

**Appendix B.**  
**Data Extraction Tables**

---

Summary Statistics of 44 Articles	
Article type	
Peer-review articles w/ quantitative data	25
Qualitative descriptive	8
Semi qualitative	1
Reviews:	6
Meta analysis (1)	
Systemic review (4)	
Literature review (1)	
Validation papers	2
Duplicates of same study (published in 3 different journals)	2
Summary of 25 Quantitative Articles	
Design type	
Pre-post	10
Pre-post w/ control group (1 study)	
RCT	14
RCT follow-up study	1
Mean Age Data	
35-39	1
45-49	2
50-54	1
55-59	3
60-64	7
65-69	4
70-74	3
80-84	1
Mean age not reported	3
Not specified (1)	
40+ included (1)	
Range groups <50-70+ (1)	
Summary Statistics of Outcomes Examined*	
Outcome	# ar
Health Behavior	14
Health Status	22
Health Care Utilization	15
Self-Efficacy	20
Other outcomes	
Health Costs	1
Ability to Work	1
Manage Life	1
Coping	1
Social Outcomes	1

\*Most articles examined multiple outcomes;  
Examining category of outcome

**Citation:** Ahmed, T., & Villagra, V. (2006). Disease management programs: program intervention, behavior modification, and dosage effect. *Journal of Consumer Policy*, 29(3), 263-278.

Design Type:	Pre-post (6 & 10 month)	
Age Group:	not specified	
Target Condition:	Diabetes Disease Management Program	
Sample Size:	N=39,292 (control: 12,104, treatment: 27,188)	
Outcomes Measured	Unit	Mean Difference from Control (a)
		Treatment
Health Costs (b)		
Over-all health costs: <1-month exposure	\$	-\$120**
6-month exposure		-\$123**
10-month exposure		-\$137**
In-patient medical costs: <1-month	\$	-\$3
6-month exposure		-\$5**
10-month exposure		-\$17**
Out-patient medical costs: <1-month	\$	-\$59**
6-month exposure		-\$59**
10-month exposure		-\$58**
Pharmacy costs: <1-month exposure	\$	-\$40**
6-month exposure		-\$41**
10-month exposure		-\$44**
Professional services: <1-month exposure	\$	-\$3
6-month exposure		-\$3*
10-month exposure		-\$4
Health Care Utilization (c)		
Overall Beddays: <1-month exposure	days	123**
6-month exposure		-195**
10-month exposure		-234**
Admissions: <1-month exposure	days	49**
6-month exposure		-55**
10-month exposure		-62**
Office visits: <1-month exposure	days	-.3**
6-month exposure		-1**
10-month exposure		1**
ER Visits: <1-month exposure	days	14.3**
6-month exposure		-68
10-month exposure		-69**

(a) Control group is health plan's pre-DDMP participants. Score compares treatment to "control" group; (b) Health Costs are based on Per Diabetic Member Per Month (PDMPM); (c) Utilization/1000 rate for diabetic members per year applies to bed days, admissions, & ER visits; office visits is calculated as average per diabetic member per year.

\*p<.05, \*\*p<.01, \*\*\*p<.001



**Citation:** Barlow, J., Turner, A., Edwards, R., & Gilchrist, M. (2009). A randomised controlled trial of lay-led self-management for people with multiple sclerosis. *Patient Education & Counseling*, 77(1), 81-89.

Design Type:	RCT (4 month & 1 year)		
Age Group:	18 or older; Mean age=49		
Target Condition:	Multiple Sclerosis		
Sample Size:	N=216, 4 months evaluation: n=105 (T=56, C=49); 1 year evaluation: n=75, (T=43, C=32)		
Outcomes Measured	Unit	Adjusted Mean Difference from Baseline	
		Treatment	Control
Health Behavior			
Cognitive Symptom Management	(0-25, 25=best)		
4-months		2	1.5
1-year		0.3	-0.8
Communication with Physician	(0-25, 25=best)		
4-months		0.7	0.2
1-year		0.6	0.2
Health Status			
Physical status	(0-100, 0=best)		
4-months		-3.3**	3.3
1-year		1.9	1.2
Psychological impact	(0-100, 0=best)		
4-months		-5.9	-2.3
1-year		1	-1.1
Pain	(0-10, 0=best)		
4-months		-0.2	-0.4
1-year		0.3	0.7
Fatigue	(0-10, 0=best)		
4-months		-0.3	-0.8
1-year		0.3	1.5
Anxiety	(0-21, 0=best)		
4-months		-0.7	-0.2
1-year		0.2	-0.4
Depression	(0-21, 0=best)		
4-months		-0.9*	0
1-year		0.6	-0.4
Self Efficacy			
Self-management self-efficacy	(10-70, 70=best)		
4-months		3.4**	-1
1-year		0.5	0.5
Multiple Sclerosis self-efficacy	(11-44, 44=best)		
4-months		0.9*	-0.4
1-year		-1	-0.5

Note: The evaluation at 1 year measures mean change from 4 months to 1 year

\*p<.05, \*\*p<.01, \*\*\*p<.001, †p<.10

**Citation:** Barlow, J., Wright, C. C., Turner, A. P., & Bancroft, G. V. (2005). A 12-month follow-up study of self-management training for people with chronic disease: are changes maintained over time? *British Journal Of Health Psychology*, 10(4), 589-599.

<b>Design Type:</b>	Pre-post (4 months & 2 years)	
<b>Age Group:</b>	Mean age=54	
<b>Target Condition:</b>	1 or more chronic conditions	
<b>Sample Size:</b>	N=171	
Outcomes Measured	Unit	Mean Change Scores (4-12 months)*
		Treatment
<b>Health Behavior</b>		
Cognitive Symptom Management		-0.14*
Communication w/ Physician		-0.07*
<b>Health Status</b>		
Health Assessment Questionnaire		-0.03
Fatigue		-0.33*
Pain		-0.1
Shortness of Breath		0.14
Anxiety		0.04*
Depression		-0.2*
Health Distress		0*
<b>Health Care Utilization</b>		<b>Mean (SD)</b>
Visit to Physician - Baseline	days	2.45(2.04)
4 months		2.55(2.83)
12 months		2.32(2.23)
Visit to Specialist - Baseline	days	1.41(1.77)
4 months		1.40(2.83)
12 months		1.33(2.11)
Visit to ER - Baseline	days	.20(.55)
4 months		.23(1.6)
12 months		.22(1.01)
# Nights Hospitalized - Baseline	nights	.20(.93)
4 months		.55(1.95)
12 months		.46(2.24)
<b>Self Efficacy</b>		
Self-Efficacy: disease		0.58
Self-Efficacy: symptoms		0.7

Note: Change scores adjusted for anxiety

\*: within 99% CI, if p-value is not specified



<b>Citation:</b> Bedell, G. (2008). Balancing health, work, and daily life: Design and evaluation of a pilot intervention for persons with HIV/AIDS. <i>Work</i> , 31(2), 131-144.	
<b>Design Type:</b>	Pre-post (2 years)
<b>Age Group:</b>	Mean age=39; range 24-62
<b>Target Condition:</b>	HIV/AIDS
<b>Sample Size:</b>	N=53
Outcomes Measured	Effect Size (from Baseline)
<b>Health Status</b>	
Flanagan Quality of Life Scale (Adapted)	0.22
Sign & Symptoms Checklist for Persons with HIV	0.18
<b>Self Efficacy</b>	
Medication Adherence Self-efficacy Scale	0.25
Patient Self-Advocacy Scale	0.22
<b>Other outcomes</b>	
Perceived Ability to Work	0.72***
Perceived Ability to Balance Health, Work & Daily Life	0.46
Vocational Performance Measure	0.25
Management of Symptoms & Side-effects Scale	0.09
Management of Daily Life Scale	0.03
Health Management at Work Scale (working)	0.61
Health Management at Work Scale (unemployed)	0.28

Note: effect size is the difference in mean scores between post-test and pre-test scores divided by the pooled standard deviation of these scores.

\*p<.05, \*\*p<.01, \*\*\*p<.001, †p<.10

**Citation:** Ersek, M., Turner, J. A., Cain, K. C., & Kemp, C. A. (2008). Results of a randomized controlled trial to examine the efficacy of a chronic pain self-management group for older adults. *Pain*, 138(1), 29-40.

<b>Design Type:</b>	RCT			
<b>Age Group:</b>	65+, Mean age=82			
<b>Target Condition:</b>	Chronic Pain			
<b>Sample Size:</b>	N=218, T=115, C=103			
Outcomes Measured	Effect Size	Unit	Mean (SD)	
			Treatment	Control
<b>Health Status</b>				
Disability (Roland Morris Disability Questionnaire)	.08*	(0-24)		
Pain Intensity	.03*	(0-10)		
Pain Interference	-.09*	(0-10)		
Depression (Geriatric Depression Scale)	.26*	(0-30)		
<b>Health Care Utilization (Medication Use)</b>				
Acetaminophen - Baseline		% using	54.1	58.5
Post-intervention			60.5	66.7
1-year			56.1	58.3
Opioids - Baseline		% using	26.3	32.5
Post-intervention			24.2	28.4
1-year			36.8	33.0
Nonsteroidal Anti-inflammatory Drugs (NSAIDs)		% using	27.8	43.1
Post-intervention			32.3	43.1
1-year			29.8**	32.4
Other - Baseline		% using	18.0	19.5
Post-intervention			19.4	15.7
1-year			12.3	16.5
<b>Self Efficacy</b>				
Self Efficacy - Baseline		(1-10)	5.7 (2.0)	5.5 (1.9)
Post-intervention			6.3 (1.8)	5.7 (1.9)
1-year			6.2 (2.2)	6.0 (2.0)
<b>Other measures</b>				
Coping Strategies Questionnaire - Baseline		(0-6)	1.3 (1.1)	1.4 (1.2)
Post-intervention			1.0 (1.1)	1.2 (1.2)
1-year			1.1 (1.1)	1.1 (1.2)
CPCI Guarding - Baseline		(0-7)	3.5 (1.7)	3.7 (1.6)
Post-intervention			3.5 (1.7)	3.4 (1.8)
1-year			3.4 (1.8)	3.2 (1.7)
CPCI Resting - Baseline		(0-7)	3.5 (1.6)	3.4 (1.6)
Post-intervention			3.5 (1.7)	3.4 (1.6)
1-year			3.4 (1.7)	3.4 (1.7)
CPCI Asking for Assistance - Baseline		(0-7)	1.7 (1.9)	1.9 (2.0)
Post-intervention			1.8 (2.0)	1.9 (1.9)
1-year			1.7 (2.0)	1.9 (1.9)
CPCI Relaxation - Baseline		(0-7)	2.0 (1.5)	2.0 (1.5)
Post-intervention			3.0 (1.5)	2.4 (1.5)
1-year			2.5 (1.5)**	2.1 (1.4)
CPCI Task Persistence - Baseline		(0-7)	4.3 (1.7)	4.4 (1.6)
Post-intervention			4.2 (1.6)	4.2 (1.7)
1-year			3.9 (1.8)	4.4 (1.8)
CPCI Exercise/stretch - Baseline		(0-7)	2.7 (2.0)	2.7 (1.7)
Post-intervention			3.4 (1.8)	3.0 (1.7)
1-year			3.0 (1.9)*	2.5 (1.8)
CPCI Seeking Support - Baseline		(0-7)	2.4 (1.7)	2.3 (1.6)
Post-intervention			2.6 (1.7)	2.2 (1.5)
1-year			2.5 (1.8)	2.3 (1.5)
CPCI Coping Self-statements - Baseline		(0-7)	3.8 (1.8)	3.9 (1.7)
Post-intervention			3.9 (2.0)	3.6 (1.7)
1-year			3.7 (2.1)	3.5 (1.7)
CPCI Pacing - Baseline		(0-7)	4.1 (1.8)	4.3 (1.7)
Post-intervention			4.4 (1.9)	4.1 (1.7)
1-year			4.3 (2.0)*	3.9 (1.8)

Notes: the effect size is unstandardized estimates from the mixed effects models; The p-values for Health care Utilization are for differences at baseline and from using Pearson's Chi-square; The range for all CPCI subscales scores refers to 0-7 days/week that the respondent reports using specific coping strategies.

\*p<.05, \*\*p<.01, \*\*\*p<.001; \* within 95% CI, if p-value is not specified

**Citation:** Gitlin, L. N., Chernet, N. L., Harris, L. F., Palmer, D., Hopkins, P., & Dennis, M. P. (2008). Harvest Health: Translation of the Chronic Disease Self-Management Program for Older African Americans in a Senior Setting. *Gerontologist*, 48(5), 698-705.

<b>Design Type:</b>	Pre-post (4 month)	
<b>Age Group:</b>	60 and older; Mean age=73.1	
<b>Target Condition:</b>	1 or more chronic condition	
<b>Sample Size:</b>	N=414	
Outcomes Measured	Unit	Mean Difference from Baseline (SD)
		Treatment
<b>Health Behavior</b>		
Strengthening & Stretching exercise	(0-4, 4=more than 3 hrs/wk)	0.6 (1.6)***
Other exercise activities	(0-4, 4=more than 3 hrs/wk)	1.3 (3.3)***
Cognitive symptom management: Cognitive strategies	(0-5, 5=best)	0.2 (1.0)***
Cognitive symptom management: Relaxation strategies	(0-5, 5=best)	-0.3 (1.1)***
Communication with physician	(0-5, 5=best)	0.1 (1.3)
<b>Health Status</b>		
Self-rated health	(1-5, 1=best)	0.1 (0.7)
Disability	(0-4, 0=best)	0.0 (0.2)
Social role function		-0.1 (0.8)**
Energy/fatigue		-0.1 (0.8)***
Health distress	(0-5, 0=best)	-0.5 (0.9)***
<b>Health Care Utilization</b>		
Physician visits	days	0.2 (3.2)
Emergency department visits	days	0.0 (0.6)
Number of times hospitalized	days	0.0 (0.4)
Number of nights in hospital	nights	0.0 (1.1)
Minimal care facility admission	days	0.1 (0.9)
<b>Self Efficacy</b>		
Self-Efficacy	(1-10, 10=best)	0.6 (2.0)***

Notes: Other outcomes (e.g. Illness intrusiveness) are also available. For other units not specified: refer to <http://patienteducation.stanford.edu/research/>

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Goeppinger, J., Armstrong, B., Schwartz, T., Ensley, D., & Brady, T. J. (2007). Self-management education for persons with arthritis: Managing comorbidity and eliminating health disparities. *Arthritis And Rheumatism*, 57(6), 1081-1088.

<b>Design Type:</b>	RCT (Communities randomized to ASHC or CDSMP); Follow-up: 4 months		
<b>Age Group:</b>	Mean age=64		
<b>Target Condition:</b>	Arthritis		
<b>Sample Size:</b>	N=416 (African Americans=365, ASHC=231, CDSMP=185); 4 months n=320, ASHC=176, CDSMP=144		
Outcomes Measured	Unit	% Change from Baseline: Standard CDSMP	% Change from Baseline: Arthritis Self Help Course
<b>Health Behavior</b>			
Cognitive Symptom Management	# minutes week	54.1	23.9
African Americans only		53.8	23.7
Stretch/strength Exercise	# minutes week	34.4	39.2*
African Americans only		60.3	33*
Aerobic Exercise	# minutes week	17.5	37.7*
African Americans only		31.9	42.9*
<b>Health Status</b>			
Health Distress	Medical Outcome Study (↓better)	-13	-1.3
African Americans only		-13.4	-0.69
Activity Limitation	(↓better)	-9.8	-2.3
African Americans only	HAQ (↓better)	-8	-1.9
Disability	HAQ (↓better)	-17.6*	4.8
African Americans only		-20	4
Self-reported health	National Health Interview Survey (↓better)	7.2*	6.4
African Americans only		8.4**	5.4
Fatigue	(↓better)	-7.8	2.2
African Americans only		-5.8	2.2
Pain	(↓better)	-13.7*	1.5
African Americans only		-13.3	2.3
<b>Health Care Utilization</b>			
Physician visits	days	-17.3	6.1
African Americans only		-27.6	10.7
Hospitalizations	days	41.5	12.5
African Americans only		88	40
Nights in hospitals	nights	-36.4	43.6
African Americans only		-119.3	221.5
<b>Self Efficacy</b>			
Self Efficacy	(0-8, 8=best)	14.1*	12.9**
African Americans only		11.2	12.5**

Note: Results are from the 4 month evaluation of CDSMP; Sub-sample analysis of African Americans only  
Partial results for a 1-year evaluation is also available.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Haas, M., Group, E., Muench, J., Kraemer, D., Brummel-Smith, K., Sharma, R., et al. (2005). Chronic disease self-management program for low back pain in the elderly. *Journal Of Manipulative And Physiological Therapeutics*, 28(4), 228-237.

<b>Design Type:</b>	RCT (follow up at 6 months)	
<b>Age Group:</b>	60 or older, Mean age=77	
<b>Target Condition:</b>	Low Back Pain (3-months or longer)	
<b>Sample Size:</b>	N=109 (T=60, C=49)	
Outcomes Measured	Unit	Adjusted Mean Difference Between Treatment & Control (SE)
<b>Low Back (a)</b>		
Pain	(0-100, 0=best)	-1.0(4.8)
Disability	(0-100, 0=best)	-5.8(5.3)
Pain days	days in the last 2 wks	-0.7(1.0)
Disability days	days in the last 2 wks	-1.2(0.6)
<b>General Health Status (b)</b>		
Energy-fatigue	(0-100, 100=best)	5.1(4.7)
Well-being	(0-100, 100=best)	7.6(3.6)*
General Health	(0-100, 100=best)	-1.3(1.0)
<b>Self Efficacy</b>		
Pain	(10-100, 100=best)	-3.9(4.9)
Other symptoms	(10-100, 100=best)	2.5(4.5)

(a) An advantage for the intervention is indicated by a negative adjusted mean difference

(b) An advantage for the intervention is indicated by a positive adjusted mean difference

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Jerant, A., Moore-Hill, M., & Franks, P. (2009). Home-based, peer-led chronic illness self-management training: findings from a 1-year randomized controlled trial. *Annals Of Family Medicine*, 7(4), 319-327.

<b>Design Type:</b>	RCT (follow up at 6 months & 1 year)			
<b>Age Group:</b>	40 and older; Mean age=60			
<b>Target Condition:</b>	1 or more chronic condition, program was Homing in on Health (HioH)			
<b>Sample Size:</b>	N=415 (Home=138, Telephone=139, Usual Care=138)			
Outcomes Measured	Unit	Mean (SD)		
		Treatment-Home	Treatment-Telephone	Control-Usual care
<b>Primary outcome</b>				
SF-36 physical component summary score		ns @ all interventions	ns	ns
SF-36 mental component summary score		ns	ns	ns
<b>Secondary outcome</b>				
General Health score		ns	ns	ns
EuroQol-5D score		ns	ns	ns
EuroQol Visual Analog scale - 6 weeks*		75.7(18.5)**	73.5(18.9)	72.4(19.7)
6 months		74.6(17.5)*	73.0(20.4)	72.9(18.9)
1 year		75.7(15.2)**	72.3(20.1)	72.3(18.9)
Health Assessment Questionnaire		ns	ns	ns
CES-D score	10-item	ns	ns	ns
Pills taken/Pills prescribed	%	ns	ns	ns
<b>Health Care Utilization</b>				
Hospitalizations	%	ns	ns	ns
Expenditures	\$	ns	ns	ns
<b>Self Efficacy</b>				
Self Efficacy - 6 weeks**		7.6(1.5)**	7.2(1.8)	7.2(1.9)
6 months		7.5(1.6)*	7.2(1.8)	7.2(1.7)
1 year		7.4(1.6)	7.3(1.7)	7.2(1.8)

Notes: Results are only reported for variables with significant findings; EuroQol VAS scores: home group scores significantly higher than control at 6wks/6mnths/1yr & higher than telephone group at 1yr only; Self-efficacy scores: home group scores significant higher than control AND telephone group at 6 weeks & 6 months, but no longer present at 1 year.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Kendall, E., Catalano, T., Kuipers, P., Posner, N., Buys, N., & Charker, J. (2007). Recovery following stroke: The role of self-management education. *Social Science & Medicine*, 64(3), 735-746.

<b>Design Type:</b>	RCT				
<b>Age Group:</b>	Aged 25-82; Mean=66				
<b>Target Condition:</b>	Stroke				
<b>Sample Size:</b>	N=100 (T=58, C=42)				
Outcomes Measured	Unit	Mean Difference from Baseline (SD)~		Stat. Significance of Treatment Main Effect	Stat. Significance of Treatment Time Interaction Effect
		Treatment	Control		
<b>Health Status</b>					
Vision	SSQOL <sup>α</sup>	-0.04	0.11		
Language	SSQOL <sup>α</sup>	0.22	-0.58		
Mobility	SSQOL <sup>α</sup>	1.18	0.51		
Fine Motor Tasks	SSQOL <sup>α</sup>	1.03	0.56		*
Energy	SSQOL <sup>α</sup>	0.83	1.57		
Thinking	SSQOL <sup>α</sup>	0.18	0.52		
Personality	SSQOL <sup>α</sup>	-0.17	0.54		
Mood	SSQOL <sup>α</sup>	1.05	0.70		
<b>Self Efficacy</b>					
Self-care	SSQOL <sup>α</sup>	1.22	1.63	*	*
<b>Social Outcomes</b>					
Work productivity	SSQOL <sup>α</sup>	1.55	1.47		*
Social roles	SSQOL <sup>α</sup>	2.81	1.18		
Family roles	SSQOL <sup>α</sup>	1.36	0.66		**

Notes: Unadjusted mean differences generated from the means for 3 months after stroke to 1 year after stroke. CDSMP was provided between 3 and 6 months after stroke. The means for 6 and 9 months are also available. The significance is from F-tests from mixed-effects models

<sup>α</sup>SSQOL: Stroke Specific Quality of Life

\*p<.05, \*\*p<.01, \*\*\*p<.001



**Citation:** Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., Richardson, G., et al. (2007). The effectiveness and cost effectiveness of a national lay-led self care support programme for patients with long-term conditions: a pragmatic randomised controlled trial. *Journal Of Epidemiology And Community Health*, 61(3), 254-261.

<b>Design Type:</b>	RCT
<b>Age Group:</b>	Mean age=55
<b>Target Condition:</b>	1 or more chronic condition
<b>Sample Size:</b>	Baseline: N=629; 6 month follow up: n=521
Outcomes Measured	Effect Size
<b>Health Behavior</b>	
Exercise 6-month	0.13*
Partnership w/ clinicians 6-month	0.25**
<b>Health Status</b>	
General Health 6-month	0.11
Energy 6-month	0.18**
Social role limitation 6-month	0.19**
Pain 6-month	0.1
Psychological Well-being 6-month	0.25***
Health Distress 6-month	0.20**
<b>Health Care Utilization</b>	
Health care visits 6-month	0.03
Inpatient days 6-month	0.13
Outpatient appointments 6-month	0.01
General Practitioner visits (surgery) 6-month	0.01
<b>Self Efficacy</b>	
6-month	0.44***

Notes: The effect size is the adjusted difference in means divided by the pooled SD. Other outcome measures such as diet and relaxation are available.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K., Ritter, P. L., & Plant, K. (2005). A disease-specific self-help program compared with a generalized chronic disease self-help program for arthritis patients. *Arthritis And Rheumatism*, 53(6), 950-957.

<b>Design Type:</b>	RCT (Follow up at 4 month & 1 year)				
<b>Age Group:</b>	Mean age: 65				
<b>Target Condition:</b>	Arthritis				
<b>Sample Size:</b>	Baseline: N=355, T=239, C=116; 1 year follow-up: T=209, C=97				
	Treatment=ASMP: Arthritis Self-Management Program				
	Control=CDSMP: Chronic Disease Self-Management Program				
Outcomes Measured	Unit	(Least-squared) Means		Effect Size from Baseline	
		Treatment	Control	Treatment	Control
<b>Health Behavior</b>					
Aerobic exercise -4 months	(minutes/week)	59.8	67.9	0.212***	0.176
1-year		63.2	57.4	0.066	0.03
Stretching & strength exercise -4 months	(minutes/week)	142.8	141.9	0.241***	0.263*
1-year		117.4	113.6	0.313***	0.092
<b>Health Status</b>					
Health distress -4 months	(0–5, 0=best)	1.72*	1.96	0.366***	0.095
1-year		1.67	1.72	0.415***	0.373**
Self-reported global health -4 months	(0–5, 0=best)	3	3.13	0.074	0.214*
1-year		2.93***	3.21	0.011	0.279**
Activity limitation -4 months	(0–4, 0=best)	1.32*	1.55	0.399***	0.26**
1-year		1.33	1.41	0.402***	0.357***
Disability -4 months	(0–3, 0=best)	0.388	0.414	0.068	0.026
1-year		0.365	0.399	0.121*	0.035
Fatigue -4 months	(0–10, 0=best)	4.8*	5.28	0.164**	0.043
1-year		4.76**	5.43	0.174**	0.013
Pain -4 months	(0–10, 0=best)	4.91	5.3	0.266***	0.103
1-year		4.82	5.27	0.27***	0.177
Practice mental stress management -4 months	(0–7, 7=best)	1.4	1.59	0.079	0.227
1-year		1.79	2.24	0.185*	0.356*
<b>Health Care Utilization</b>					
Physician visits -4 months	times/past 4 months	3.11	3.48	0.038	0
1-year		3.08	3.3	0.042	0.06
Hospitalizations -4 months	times/past 4 months	0.072	0.089	0	0.25
1-year		0.091	0.062	0.05	-0.212
<b>Self Efficacy</b>					
Self efficacy	(1–10, 10=best)	6.43	6.12	0.251	0.195
1-year		6.61	6.21	0.328***	0.23

Notes: the uniqueness of the table format - the last 4 columns - due to the different control group setting

Effect size from baseline for each group is mean difference for each group. The authors used this term in this paper.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K., Ritter, P., Stewart, A. L., Sobel, D. S., Brown, B. W., Jr., Bandura, A., et al. (2001). Chronic disease self-management program: 2-year health status and health care utilization outcomes. Medical Care, 39(11), 1217-1223.

<b>Design Type:</b>	Pre-post	
<b>Age Group:</b>	40 and older; Mean=65.3	
<b>Target Condition:</b>	1 or more chronic condition	
<b>Sample Size:</b>	N=831 (1-year: n=683; 2-year: n= 599)	
Outcomes Measured	Unit	Mean Difference from Baseline (SD)
		Treatment
<b>Health Status</b>		
Self-rated Health	(1-5, 1=best)	
1-year		-0.031(0.725)
2-year		-0.060(0.761)
Disability	(0-3, 0=best)	
1-year		0.035(0.412)*
2-year		0.026(0.443)
Social/role activities limitation	(0-4, 0=best)	
1-year		0.000(0.986)
2-year		-0.031(1.12)
Energy/fatigue	(0-5, 5=best)	
1-year		0.045(0.846)
2-year		0.077(0.912)*
Health distress	(0-5, 0=best)	
1-year		-0.199(0.997)***
2-year		-0.290(1.02)***
<b>Health Care Utilization</b>		
MD and ER Visits	times/past 6 months	
1-year		-0.689(6.51)**
2-year		-0.564(6.22)*
Hospitalizations	times/past 6 months	
1-year		-0.012(0.914)
2-year		0.034(1.03)
Hospital days	days	
1-year		-0.111(4.69)
2-year		0.256(6.67)
<b>Self Efficacy</b>		
Self-Efficacy	(1-10, 10=best)	
1-year		0.310(1.67)***
2-year		0.270(1.78)**

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K., Ritter, P. et al. (2008). The Expert Patients Programme online, a 1-year study of an Internet-based self-management programme for people with long-term conditions, *Chronic Illness* 4(4), 247-256.

<b>Design Type:</b>	Pre-post (6-month & 1-year)	
<b>Age Group:</b>	18 and older; Median age=45	
<b>Target Condition:</b>	1 or more chronic condition	
<b>Sample Size:</b>	Baseline=593; 6 month=459	
Outcomes Measured	Unit	Mean Difference from Baseline (SD)
<b>Health Behavior</b>		
Aerobic exercise: 6 months	(min/wk)	9.40 (76.2)**
1-year		14.6 (83.3)***
Stretching & strengthening exercise: 6 months	(min/wk)	10.7 (54.4)***
1-year		6.62 (52.2)**
Communication with physician: 6-months	(0–5, 5=best)	0.363 (1.23)***
1-year		0.468 (1.19)***
Practice mental stress management: 6 months	(0–5, 5=best)	0.692 (4.90)**
1-year		0.639 (4.70)**
Satisfaction with health care: 6-months	(0–5, 5=best)	0.166 (1.02)***
1-year		0.467 (1.16)***
<b>Health Status</b>		
Health distress: 6-months	(0–5, 0=best)	-0.460 (1.04)***
1-year		-0.580 (1.15)***
Self-rated health: 6-months	(0–5, 0=best)	-0.048 (0.766)
1-year		-0.140 (0.867)***
Illness intrusiveness: 6-months	(0–7, 0=best)	-0.244 (0.841)***
1-year		-0.280 (0.935)***
Disability: 6-months	(0–3, 0=best)	0.004 (0.305)
1-year		-0.001 (0.308)
Tiredness: 6-months	(0–10, 0=best)	-0.379 (1.78)***
1-year		-0.611 (1.85)***
Pain: 6-months	(0–10, 0=best)	-0.373 (2.23)***
1-year		-0.409 (2.27)***
Shortness of breath: 6-months	(0–10, 0=best)	-0.285 (2.23)**
1-year		-0.334 (2.39)**
<b>Health Care Utilization</b>		
GP visits: 6-months	(0-40, past 6 mo)	-1.02 (4.34)***
1-year		-1.17 (5.39)***
ER visits: 6-months	(0-30, past 6 mo)	-0.224 (1.81)***
1-year		-0.257 (2.10)*
Hospitalization: 6-months	(0-19, past 6 mo)	-0.002 (0.631)
1-year		-0.097 (1.40)
Pharmacy visits: 6-months	(0-90)	-0.732 (5.91)***
1-year		-0.627 (5.96)*
Therapist visits: 6-months	(0-52)	-0.432 (6.20)
1-year		-0.796 (7.36)*
<b>Self Efficacy</b>		
Self efficacy: 6-months	(0–10, 10=best)	0.840 (2.02)***
1-year		0.774 (2.140)***

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K., Ritter, P. L., & González, V. M. (2003). Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nursing Research*, 52(6), 361-369.

<b>Design Type:</b>	RCT		
<b>Age Group:</b>	Mean age=56		
<b>Target Condition:</b>	1 or more chronic condition		
<b>Sample Size:</b>	N=551 (4 months evaluation, n=443, 1 year evaluation, n=271)		
Outcomes Measured	Effect Size (4 months)	Unit	Mean Difference from Baseline (SD) 1-Year Follow-up
			Treatment
<b>Health Behavior</b>			
Exercise: 4 months	0.28***	minutes/week	
1-year			59.0(148)***
Communication with physician: 4 mo	0.34***	(1-3, 3=best)	
1-year			0.73(1.68)***
Mental status management: 4 months	0.71***	minutes/week	
1-year			0.62(2.48)***
Currently use tobacco: 4 months	-0.02	percent	
1-year			-0.01(0.10)*
<b>Health Status</b>			
Self-reported health: 4 months	-0.48***	(0-23, 0=best)	
1-year			-0.28(0.94)***
Health distress: 4 months	-0.47***	(0-5, 0=best)	
1-year			-0.79(1.52)***
Fatigue: 4 months	0.27***	(1-10, 1=best)	
1-year			-1.34(3.42)***
Pain/physical discomfort: 4 months	-0.23**	(0-10, 0=best)	
1-year			-1.31(4.42)***
Role function: 4 months	-0.26***	(0-7, 0=best)	
1-year			-0.39(1.10)***
<b>Health Care Utilization</b>			
Physician visits: 4 months	0.02*	# 4 months	
1-year			0.15 (2.53)
ER visits: 4 months	-0.29**	# 4 months	
1-year			-0.012(0.75)**
Hospital days: 4 months	0.04	# 4 months	
1-year			-0.05(1.71)
<b>Self Efficacy</b>			
Self Efficacy: 4 months	0.16***	(1-10, 10=best)	
1-year			1.17(3.10)***

Note: Participants are of Hispanic origin and the training was imparted in Spanish

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K., Ritter, P. L., & Jacquez, A. (2005). Outcomes of border health Spanish/English chronic disease self-management programs. *The Diabetes Educator*, 31(3), 401-409.

<b>Design Type:</b>	pre-post test			
<b>Age Group:</b>	18+ Mean age=61.3(Spanish Speakers=SS); 62.1(English Speakers=ES)			
<b>Target Condition:</b>	1 or more chronic condition; two thirds had type 2 diabetes			
<b>Sample Size:</b>	Baseline: SS=322, ES=123; 4 month: SS=261; ES=104			
Outcomes Measured	Unit	Mean Difference from Baseline (SD) Treatment		
		Spanish Speakers	English Speakers	Sub-sample: Spanish Speakers w/Diabetes
<b>Health Behavior</b>				
Eat breakfast/week: 4 month	(0-7)	.92(2.44)***	.52(1.90)**	1.04(2.49)***
1-year		.86(2.47)***		.81(2.35)***
Communication with physician: 4 month	(0-5, 1=best)	.04(1.37)	.35(.35)**	.00(1.32)
1-year		.03(1.47)		.07(1.48)
Practice mental stress mgmt: 4 month	(0-7, 7=best)	.97(2.83)***	.78(.78)**	1.08(2.77)***
1-year		.39(2.65)*		.36(2.65)
Aerobic exercise: 4 month	min/wk	47.4(144)***	26.8(94.1)**	49.5(135)***
1-year		22.8(146)***		30.7(148)*
<b>Health Status</b>				
Self-rated health: 4 month	(1-5, 1=best)	-.20(.83)***	-.33(.90)***	-.35(.80)***
1-year		-.15(.89)*		-.27(.84)***
Energy/fatigue: 4 month	(0-5, 5=best)	-.17(3.41)	-.12(2.73)	-.34(3.40)
1-year		.16(3.41)		-.07(3.44)
Health distress : 4 month	(0-5, 0=best)	-.85(1.29)***	-.48(1.05)***	-.89(1.28)***
1-year		-.83(1.40)***		-.89(1.37)***
Activity limitations: 4 month	(1-5, 1=best)	-.37(1.14)***	-.30(1.05)**	-.48(1.24)***
1-year		-.39(1.10)*		-.43(1.18)***
Shortness of breath: 4 month	(0-10, 0=best)	-.51(2.55)**	-.57(2.52)*	-.42(2.60)*
1-year		-.23(3.06)		-.43(2.83)
Pain: 4 month	(0-10, 0=best)	-1.01(3.22)***	-.24(2.84)	-1.35(3.26)***
1-year		-.20(3.41)		-.51(3.32)
<b>Health Care Utilization</b>				
Physician visits/past 4 mo	days	.34(2.10)**	-.19(2.10)	.42(1.98)**
1-year		-.20(3.41)		.45(2.22)*
ER visits/past 4 mo	times	0.0(.59)	.01(.55)	.01(.66)
1-year		.01(.55)		0.0(.67)
Nights in hospital/past 4 mo	nights	-.07(1.94)	-.43(4.55)	-.01(3.21)
1-year		-.06(.43)*		-.10(2.97)
<b>Self Efficacy</b>				
Self-efficacy: 4 month	(1-10, 10=best)	1.76(3.04)***	.64(2.66)*	1.78(2.91)***
1-year		1.17(3.00)***		1.30(2.75)***

\*p<.05, \*\*p<.01, \*\*\*p<.001

<b>Citation:</b> Lorig, K., Ritter, P. L., Laurent, D. D., & Plant, K. (2006). Internet-based chronic disease self-management: a randomized trial.		
<b>Design Type:</b>	RCT	
<b>Age Group:</b>	Mean age=57	
<b>Target Condition:</b>	Heart, Lung, or Type 2 Diabetes	
<b>Sample Size:</b>	Baseline: N=958	
Outcomes Measured	Effect Size	Unit
<b>Health Behavior</b>		
Stretching & strengthening exercise 1-year	0.308*	(min/wk)
Aerobic exercise 1-year	0.058	(min/wk)
Practice stress management 1-year	0.044	(times/wk)
Communication with physician 1-year	0.074	(0–5, 5=best)
<b>Health Status</b>		
Self-rated health 1-year	0.039	(1–5, 1=best)
Disability 1-year	0.074	(0–3, 0=best)
Pain 1-year	.032*	(0–10, 0=best)
Illness intrusiveness 1-year	0.066	(1–7, 1=best)
Fatigue 1-year	.151*	(0–10, 0=best)
Health distress 1-year	.16*	(0–5, 0=best)
Shortness of breath 1-year	.229*	(0–10, 0=best)
<b>Health Care Utilization</b>		
MD visits 1-year	0.035	(n, past 6 mo)
ER visits 1-year	0.163	(n, past 6 mo)
Days in hospital 1-year	0.041	(n, past 6 mo)
<b>Self Efficacy</b>		
Self efficacy 1-year	0.096	(1–10, 10=best)

Note: The comparison of small group CDSMP to internet-based CDSMP is available but not conclusive.

\*p<.05, \*\*p<.01, \*\*\*p<.001



**Citation:** Lorig, K., Sobel, D. S., Stewart, A. L., Brown, B. W., Jr., Bandura, A., Ritter, P., et al. (1999). Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Medical Care*, 37(1), 5-14.

<b>Design Type:</b>	RCT		
<b>Age Group:</b>	40 and older; Mean age=65		
<b>Target Condition:</b>	Heart disease, lung disease, stroke, arthritis		
<b>Sample Size:</b>	N=963 (T=561; C=391)		
Outcomes Measured	Unit	Mean Difference from Baseline (SD)	
		Treatment	Control
<b>Health Behavior</b>			
Stretching & strengthening exercise 6-month	(min/wk)	13(56.7)**	5(54.6)
Aerobic exercise 6-month	(min/wk)	16(94.5)***	-2(87.0)
Cognitive symptom management 6-month	(0-5, 5=best)	.38(.77)***	.07(.73)
Communication with physician 6-month	(0-5, 5=best)	.26(.98)**	.11(.96)
<b>Health Status</b>			
Self-rated health 6-month	(1-5, 1=best)	-.09(.72)*	.02(.69)
Disability 6-month	(0-3, 0=best)	-.02(.32)*	.03(.36)
Social/role activity limitation 6-month	(0-4, 0=best)	-.07(.92)***	.08(.87)
Pain 6-month	(0-100, 1=best)	-2.6(19.4)	-2.2(17.6)
Psychological well-being 6-month	(0-5, 5=best)	.09(.69)	.04(.67)
Energy/Fatigue 6-month	(0-5, 5=best)	.14(.79)**	.02(.75)
Health distress 6-month	(0-5, 0=best)	-.24(.98)***	-.07(.97)
Shortness of breath 6-month	(0-4, 0=best)	.02(.87)	-.02(.78)
<b>Health Care Utilization</b>			
MD & ER visits 6-month	times	-.77(5.6)	-.54(6.3)
Hospital stays 6-month	times	-.07(.69)*	-.05(1.1)
Night in hospital 6-month	nights	-.28(5.2)**	.56(7.0)

Note: Secondary results for Arthritis Only, Heart Disease Only, Lung Disease Only, and Comorbid Conditions are also available. But the p-values of the results were not reported in the paper.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Lorig, K. R., Sobel, D. S., Ritter, P. L., Laurent, D., & Hobbs, M. (2001). Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice: ECP*, 4(6), 256-262.

<b>Design type:</b>	Pre-post	
<b>Age Group:</b>	18 or older; Mean age=62.2	
<b>Target Condition:</b>	1 or more chronic condition	
<b>Sample Size:</b>	N=613; 1 year n=489	
Outcomes Measured	Unit	Mean Difference from Baseline (SD)
		Treatment
<b>Health Behavior</b>		
Aerobic exercise 1-year	(min/wk)	13(97.3)**
Range-of-motion exercise 1-year	(min/wk)	9(55.8)***
Cognitive symptom management 1-year	(0–3, 3=best)	0.4(0.9)***
Communication with physician 1-year	(0–5, 5=best)	0.2(1.0)***
<b>Health Status</b>		
Disability 1-year	(0–3, 0=best)	0.0(0.3)
Health distress 1-year	(0–5, 0=best)	–0.3(1.2)***
Social/role activity limitation 1-year	(0–4, 0=best)	–0.2(1.0)***
Illness intrusiveness 1-year	(1–7, 1=best)	–0.2(1.2)***
Fatigue 1-year	(1–10, 1=best)	–0.3(2.4)**
Shortness of breath 1-year	(1–10, 1=best)	–0.3(2.5)**
Pain 1-year	(1–10, 1=best)	–0.3(2.5)*
Self-rated health 1-year	(1–5, 1=best)	0.04(0.8)
Depression 1-year	(0–3, 0=best)	–0.1(0.5)***
<b>Health Care Utilization</b>		
Physician visits 1-year	(n, past 6 mo)	–0.4 (7.2)
Emergency department visits 1-year	(n, past 6 mo)	–0.1 (1.0)*
Hospitalizations 1-year	(n, past 6 mo)	–0.1 (0.7)
Days in hospital 1-year	(n, past 6 mo)	–0.5 (7.3)
<b>Self Efficacy</b>		
Self-efficacy 1-year	(1–10, 10=best)	0.5(2.4)***

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Nolte, S., Elsworth, G. R., Sinclair, A. J., & Osborne, R. H. (2007). The extent and breadth of benefits from participating in chronic disease self-management courses: A national patient-reported outcomes survey. *Patient Education & Counseling*, 65(3), 351-360.

<b>Design Type:</b>	Pre-post		
<b>Age Group:</b>	Median=64		
<b>Target Condition:</b>	1 or more chronic condition		
<b>Sample Size:</b>	N=1169, Complete data=842		
Outcomes Measured	Effect Size	Unit	% Showing Substantial Improvement
<b>Health Behavior</b>			
Health-directed behavior	$\geq 0.5$	(0-6, 6=best)	34.6
<b>Health Status</b>			
Positive and active engagement in life	$\geq 0.5$	(0-6, 6=best)	36.9
Constructive attitudes and approaches	$\geq 0.5$	(0-6, 6=best)	32.2
Social integration and support	$\geq 0.5$	(0-6, 6=best)	32.2
Emotional wellbeing	$\geq 0.5$	(0-6, 0=best)	33.7
<b>Self Efficacy</b>			
Skill and technique acquisition	$\geq 0.5$	(0-6, 6=best)	48.9
Self-monitoring and insight	$\geq 0.5$	(0-6, 6=best)	40.7
Health service navigation	$\geq 0.5$	(0-6, 6=best)	27

Notes: Evaluation of 142 self-management courses in Australia, on completion of the course at 4-10 weeks after enrollment

Sub-group analyses by age, gender and education are available

Results are in terms of proportion of participants showing substantial improvement on the outcome in terms of a greater than 0.5 change in effect size

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Citation:** Powers, B. J., Olsen, M. K., Oddone, E. Z., & Bosworth, H. B. (2009). The Effect of a Hypertension Self-Management Intervention on Diabetes and Cholesterol Control. *American Journal of Medicine*, 122(7), 639-646.

<b>Design Type:</b>	RCT (2 year)			
<b>Age Group:</b>	(1) Diabetes Study: Mean age T=63.8, C=64.3 (2) Cholesterol Study: Mean age T=63.0, C=63.6			
<b>Target Condition:</b>	Patients with a diagnosis of hypertension			
<b>Sample Size:</b>	(1) Diabetes Study: N=219, T=102, C=117 (2) Cholesterol Study: N=528, T=269, C=259			
Outcomes Measured	Effect Size	Unit	Mean Difference (Between Treatment & Control)	Mean Difference from Baseline
				Treatment
<b>Health Status</b>				
HbA <sub>1c</sub> (glycosylated hemoglobin)	-0.36	%	-0.46*	-0.28
LDL-C (low density lipoprotein cholesterol)	N/A	mg/dL	0.9	-4.3

Note: the uniqueness of some effect measures due to the methodology (linear mixed-effects model)

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Rose, M. A., Arenson, C., Harrod, P., Salkey, R., Santana, A., & Diamond, J. (2008). Evaluation of the Chronic Disease Self-Management Program With Low-Income, Urban, African American Older Adults. *Journal of Community Health Nursing*, 25(4), 193-202.

	Pre-post w/ direct, 10 week, & 6 month follow-ups	
Design Type:		
Age Group:	Mean age=72 range: 47-96	
Target Condition:	At least one chronic condition	
Sample Size:	Baseline: N=153; 6 month: n=68	
Outcomes Measured	Unit	Mean (SD)
		Treatment
Health Behavior		
Stretching & strengthening exercise - Baseline	1 < 30 min/wk; 2=30-60 min/wk; 3=1-3 hrs/wk	1.07 (1.2)
10 week follow-up		1.40(1.3)*
6 month follow-up		1.42(1.2)*
Aerobic exercise - Baseline		.68(.9)
10 week follow-up		.63(.6)
6 month follow-up		.64(.7)
Cognitive symptom management - Baseline		1.48(1.0)
10 week follow-up		1.85(1.2)**
6 month follow-up		1.71(1.0)
Communication w/ physician - Baseline	0-5; 5=best	2.49(1.4)
10 week follow-up		2.61(1.3)
6 month follow-up		2.80(1.0)*
Health Status		
Self-rated health - Baseline	1-5, 5=best	3.49(.8)
10 week follow-up		3.20(.8)**
6 month follow-up		3.38(.7)
Disability - Baseline	0-3, 0=best	.38(.6)
10 week follow-up		.33(.5)
6 month follow-up		.35(.5)
Social/role activities/limitations - Baseline	0-4, lower=best	1.40(1.3)
10 week follow-up		1.05(1.1)*
6 month follow-up		1.24(1.1)
Pain - Baseline	0-10, 0=best	4.76(3.4)
10 week follow-up		3.83(3.3)**
6 month follow-up		4.52(3.5)
Illness intrusiveness - Baseline	13-91, 13=best	33.0(16.9)
10 week follow-up		32.4(18.4)
6 month follow-up		33.3(17.5)
Energy/fatigue - Baseline	0-5, 0=best	3.15(1.0)
10 week follow-up		2.99(1.0)
6 month follow-up		2.96(.8)*
Health Distress - Baseline	0-5, 0=best	1.70(1.3)
10 week follow-up		1.41(1.1)
6 month follow-up		1.61(1.2)
Shortness of break - Baseline	0-10, 0=best	3.31(3.1)
10 week follow-up		3.32(3.2)
6 month follow-up		3.33(3.3)

**Citation:** Rose, M. A., Arenson, C., Harrod, P., Salkey, R., Santana, A., & Diamond, J. (2008). Evaluation of the Chronic Disease Self-Management Program With Low-Income, Urban, African American Older Adults. *Journal of Community Health Nursing*, 25(4), 193-202.

<b>Design Type:</b>	Pre-post w/ direct, 10 week, & 6 month follow-ups	
<b>Age Group:</b>	Mean age=72 range: 47-96	
<b>Target Condition:</b>	At least one chronic condition	
<b>Sample Size:</b>	Baseline: N=153; 6 month: n=68	
Outcomes Measured	Unit	Mean (SD)
		Treatment
<b>Health Care Utilization</b>		
MD visits (#, past 6 months)	days	4.55(5.0)
6 month follow-up		4.00(3.8)
ER visits (#, past 6 months)	days	1.32(5.8)
6 month follow-up		.88(3.9)
Hospital stays (#, past 6 months)	visits	.34(.8)
6 month follow-up		.73(3.8)
Nights in hospital (# past 6 months)	nights	1.10(2.4)
6 month follow-up		2.03(9.3)
<b>Self-efficacy</b>		
Fatigue - baseline	1-10, 10=best	6.38(3.2)
10 week follow-up		7.17(2.7)
6 month follow-up		6.16(3.1)
Physical discomfort - Baseline	1-10, 10=best	6.25(3.1)
10 week follow-up		6.69(3.0)
6 month follow-up		6.18(3.0)
Emotional discomfort - Baseline	1-10, 10=best	6.44(3.0)
10 week follow-up		6.61(3.1)
6 month follow-up		6.35(3.0)
Symptoms - Baseline	1-10, 10=best	6.48(3.1)
10 week follow-up		7.12(2.7)
6 month follow-up		6.51(2.9)
Activities/tasks - Baseline	1-10, 10=best	6.94(2.9)
10 week follow-up		7.06(2.9)
6 month follow-up		6.05(3.1)
Improve life - Baseline	1-10, 10=best	6.74(3.0)
10 week follow-up		7.11(3.2)
6 month follow-up		6.51(3.0)
Total Self Efficacy Score - Baseline	6-60, 60=best)	37.1(17.5)
10 week follow-up		40.3(16.0)
6 month follow-up		36.2(17.1)

\*p<.05, \*\*p<.01, \*\*\*p<.001; Sample was 86% African American

**Citation:** Smeulders, E. S. T. F., van Haastregt, J. C. M., Ambergen, T., Janssen-Boyne, J. J. J., van Eijk, J. T. M., & Kempen, G. I. J. M. (2009). The impact of a self-management group programme on health behaviour and healthcare utilization among congestive heart failure patients. *European Journal Of Heart Failure: Journal Of The Working Group On Heart Failure Of The European Society Of Cardiology*, 11(6), 609-616.

<b>Design Type:</b>	RCT (direct, 6 month, 1 year follow-up)		
<b>Age Group:</b>	Mean age=67		
<b>Target Condition:</b>	Congestive heart failure		
<b>Sample Size:</b>	N=317, T=186, C=131		
Outcomes Measured (a)	Unit	Mean (SD)	
		Treatment	Control
<b>Health Behavior</b>			
Smoking	(# cigarettes/week)		
Baseline		10.2 (29.6)	13.5 (40.7)
Direct follow-up		9.0 (26.3)	11.7 (37.0)
6 month follow-up		9.6 (28.8)	8.4 (25.1)
12 month follow-up		10.0 (29.8)	9.7 (27.9)
Drinking	(# alcoholic drinks/week)		
Baseline		2.8 (5.0)	3.7 (6.3)
Direct follow-up		3.6 (6.9)	3.7 (6.2)
6 month follow-up		3.3 (6.5)	3.9 (6.6)
12 month follow-up		3.2 (5.8)	3.7 (6.2)
Body mass index			
Baseline		27.0 (5.0)	26.6 (4.1)
Direct follow-up		27.0 (5.0)	26.6 (4.2)
6 month follow-up		27.0 (5.3)	27.0 (5.4)
12 month follow-up		27.2 (5.8)	27.0 (4.0)
Walking for exercise	(minutes/month)		
Baseline		572.4 (791.0)	563.3 (713.8)
Direct follow-up		772.0 (998.0)*	588.1 (681.7)
6 month follow-up		753.3 (1050.1)	531.0 (780.4)
12 month follow-up		628.2 (762.7)	552.8 (706.5)
Other physical activities(aerobic, stretching and strength exercises, sports, and gardening)	(minutes/month)		
Baseline		144.0 (580.5)	146.0 (846.2)
Direct follow-up		224.5 (597.6)**	93.7 (219.1)
6 month follow-up		205.9 (649.5)*	86.3 (198.0)
12 month follow-up		282.5 (937.0)	141.9 (309.7)

Note: Swimming & Bicycling were reported. None of the results are significant at even at 10% level.

\*p<.05, \*\*p<.01, \*\*\*p<.001



**Citation:** Sobel, D. S., Kate R Lorig, Mary Hobbs. (2002). Chronic Disease Self-Management Program: From Development to Dissemination. The Permanente Journal, 6(2), 15-22.

<b>Design Type:</b>	RCT (1 & 2 years)	
<b>Age Group:</b>	40 or older	
<b>Target Condition:</b>	Heart disease, lung disease, stroke, arthritis	
<b>Sample Size:</b>	N=683 (1 year); n=533 (2 years)	
Outcomes Measured	Unit	Mean Difference from Baseline (SD)
		Treatment
<b>Health Status</b>		
Self-rated health	(1-5, 1=best)	
1-year		-.03(.73)
2-year		-.06(.76)
Disability	(0-3, 0=best)	
1-year		.03(.41)*
2-year		.03(.44)
Social/role activities limitations	(0-4, 4=best)	
1-year		.00(.99)
2-year		-.03(1.12)
Energy/fatigue	(0-5, 5=best)	
1-year		.05(.85)
2-year		.07(.92)
Health distress	(0-5, 0=best)	
1-year		-.20(1.0)***
2-year		-.29(1.02)***
<b>Health Care Utilization</b>		
Physician & ED visits/past 6 mo	days	
1-year		-.69(6.51)*
2-year		-.56(6.22)*
Hospital stays/past 6 mo	times	
1-year		-.01(.92)
2-year		.03(1.03)
Nights in hospital/past 6 mo	nights	
1-year		-.11(4.69)
2-year		.26(6.67)
<b>Self Efficacy</b>		
Self-efficacy in managing CD	(1-10, 10=best)	
1-year		.31(1.67)***
2-year		.27(1.78)**

Note: This study is a follow up of an RCT where they followed the treatment group only.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Swerissen, H., Belfrage, J., Weeks, A., Jordan, L., Walker, C., Furler, J., et al. (2006). A randomised control trial of a self-management program for people with a chronic illness from Vietnamese, Chinese, Italian and Greek backgrounds. *Patient Education And Counseling*, 64(1-3), 360-368.

<b>Design Type:</b>	RCT		
<b>Age Group:</b>	18 or older; Mean age=65		
<b>Target Condition:</b>	Multiple - Arthritis, High Blood Pressure, Diabetes, Heart Disease, Asthma, Others		
<b>Sample Size:</b>	N=728, T=467, C = 261; 6 months evaluation: n = 474, T =320, C = 154		
Outcomes Measured	Unit	Mean Difference from Baseline (SD)	
		Treatment	Control
<b>Health Behavior</b>			
Exercise	(0-4, 4=best)	1.01***	0.82
Cognitive Symptom Management	(0-5, 5=best)	1.3***	1.91
<b>Health Status</b>			
Self-rated health	(0-5, 0=best)	3.5***	3.81
Energy	(0-5, 5=best)	2.13***	1.87
Health Distress	(0-5, 0=best)	1.29*	1.5
Fatigue	(0-10, 0=best)	3.94*	4.54
Shortness of breath	(0-10, 0=best)	1.85	1.95
Pain	(0-10, 0=best)	3.69***	4.69
Disability	(1-4, 1=best)	1.2	1.23
Illness Intrusiveness	(0-4, 0=best)	2.8	3.07
Depression	(0-3, 0=best)	1.02	1.05
Role function	(0-7, 0=best)	0.87	1.04
<b>Self Efficacy</b>			
Self Efficacy	(1-10, 10=best)	7.29***	6.13

Note: Evaluation of outcomes at 6 months

Training in Chinese, Vietnamese, Italian and Greek languages. Results for the sub-groups are available.

\*p<.05, \*\*p<.01, \*\*\*p<.001

**Citation:** Cummings, E., & Turner, P. (2009). Patient self-management and chronic illness: evaluating outcomes and impacts of information technology. *Studies In Health Technology And Informatics*, 143, 229-234.

<b>Design Type:</b>	Participants randomized to control (usual care) & receiving Informations and Communications Tech (ICT)	
<b>Age Group:</b>	Not specified	
<b>Target Condition:</b>	Patients with Chronic Obstructive Pulmonary Disease (COPD)	
<b>Sample Size:</b>	N=12	
Outcomes Measured	Effect Size	
	Non-IT (control)	IT (Treatment)
<b>Health Status</b>		
Physical Cumulative Summary	1.49	0.22
Mental Cumulative Summary	0.52	0.31
Anxiety (HADS)	1.27	0.51
Depression (HADS)	-1.2	-1.16
<b>Self Efficacy</b>		
Self efficacy	-0.97	0.23

Notes: Significance levels not reported

Table classifies ICT tool as not having positive effect, negative effect could be considered.

Health Status subscales derived from the Hospital Anxiety and Depression Scale

**Appendix C.**  
**Additional Extraction Table**

---

Article #	Citation	Fidelity to Stanford CDSMP	Randomization Notes	Site Information	Screening	Country/Region
1	Ahmed & Villagra (2006)	no stated modifications	non-random	10 sites	none specified, selection favored those with diabetes	Chicago, Kansas, Dallas, Houston, Denver, Mid-Atlantic, Nashville, Florida, Ohio, Tri-state
3	Barlow, Turner, et al (2009)	CDSMP implemented by NHS, with lay leaders	MS patients randomized to treatment of control; also followed group of informed non-attenders	12 courses; # sites & geographical spread not specified	Multiple Sclerosis patients	England
4	Barlow, Wright, et al (2005)	CDSMP implemented by NHS, with lay leaders	non-random		none specified	England
7	Bedell (2008)	Modified version of CDSMP for work transition & self-management skills for HIV/AIDS patients.	non-random	The study took place at MTS, a job skills training program for persons with HIV/AIDS	This study is for persons with HIV/AIDS who are in work transition.	New York City
12	Ersek, Turner et al (2008)	Modified CDSMP program for PAIN	Recruitment from 43 retirement communities. 36 facilities were randomized & 7 facilities randomized individually	43 retirement communities	Exclusion criteria were active cancer or surgery next 6 months	Puget Sound area of Washington State
14	Gitlin, Chernett, et al (2008)	Modified for urban older African Americans in Philadelphia, delivered by a senior center. named Harvest Health.	non-random	38 course conducted over 3 years	older African Americans	Philadelphia, PA

Article #	Citation	Fidelity to Stanford CDSMP	Randomization Notes	Site Information	Screening	Country/Region
15	Goeppinger, Armstrong et al (2007)	CDSMP & Arthritis Self-help Course (ASHC). Only one or the other was administered to a participant. They were modified for cultural acceptability.	Randomization at group level to receive CDSMP or another Arthritis specific program. Not randomized within program	48 workshops; # sites not specified	none specified; predominantly African American	Southeastern U.S.; 12 counties in eastern North Carolina
17	Haas, Group, et al (2005)	no stated modifications	Participants randomized to receive workshop immediately (treatment) or wait for 6 months (control group)	12 sites (OASIS institute, 2 YMCAS, 5 senior residences, 1 community center, 1 church	African American or White, aged 60+, suffer from chronic LBP, ability to read & write English. Exclusion: dementia, significant heart or respiratory illness, serious blood disorders, participation in another health program, unwillingness to be randomized.	not specified. In U.S.
19	Jerant, Moore-Hill et al (2009)	Used Homing in on Health (HioH), a CDSMP variant	Randomized into control, and treatment at home or telephone	Those receiving treatment by home and telephone compared to control; recruitment through 12 physician offices	Ability to speak & read English; residence in home with telephone; adequate hearing and eyesight; at least 1 activity impairments	northern California
21	Kendall, Catalano, et al (2007)	Modified CDSMP for recent stroke patients	Stroke patients randomized to treatment and control	single hospital	stroke patients	southeast Australia
22	Kennedy, Reeves, et al (2007)	CDSMP implemented by NHS, with lay leaders	Randomized on participant level	National: Recruitment by 28 strategic health authorities	none specified	England
24	Lorig, Ritter et al (2001)	no stated modifications	non-random	not-specified	none specified	US

Article #	Citation	Fidelity to Stanford CDSMP	Randomization Notes	Site Information	Screening	Country/Region
25	Lorig, Ritter, et al (2008)	Online version of EPP (Expert Patients Programme), based on the CDSMP	non-random	online	exclusion: treatment for cancer, being pregnant	England
26	Lorig, Ritter, Gonzalez, et al (2003)	Spanish-language version called Tomando Control de Su Salud: not direct translation, cultural modifications	Participants randomized to treatment and wait listed control	58 programs	targeted Hispanic population	northern California
27	Lorig, Ritter, Jacquez, et al (2005)	Spanish-language version called Tomando Control de Su Salud: not direct translation, cultural modifications	non-random	31 Spanish programs/ 13 English programs	1+ chronic condition & 18+	Texas, New Mexico, & Chihuahua, Mexico
28	Lorig, Ritter, Laurent, et al (2006)	Online version of CDSMP	Participants randomized to intervention group (online + usual care) or control group (usual care only)	online	exclusion: treatment for cancer, previous participation in CDSMP	Not specified. But somewhere in US.
29	Lorig, Ritter, Plant, et al (2005)	Compared Arthritis Self-Management Program (ASMP) & generic CDSMP.	Two-thirds randomized for disease specific Arthritis SMP	not mentioned	exclusion: previous participation in ASMP or CDSMP	San Francisco Bay Area
30	Lorig, Sobel, Stewart, et al (1999)	no stated modifications	Participants randomized serially. After all subjects had applied to a specific site, the randomization ratio (treatment versus controls) was determined to assure 10-15 treatment subjects.	multiple community sites in 4 county area	exclusion: patients with compromised mentation; cancer patients	San Francisco Bay Area

Article #	Citation	Fidelity to Stanford CDSMP	Randomization Notes	Site Information	Screening	Country/Region
31	Lorig, Sobel, Ritter, et al (2001)	no stated modifications	non-random	21 sites (8 in Northern California, 6 in Southern California, 1 in Ohio, 1 in Georgia, 3 in Colorado, & 1 in Seattle)	none specified	Seven KP Regions
32	Nolte, Elsworth, et al (2007)	Fidelity to CDSMP not specifically mentioned.	non-random	National: multiple programs, offered by lay leaders & health professionals,	none specified	Australia
34	Powers, Olsen, et al (2009)	Modified CDSMP program delivered by nurses via phone	Randomization at provider & patient level. Primary care providers randomized to receive computer decision support or usual care. Hypertension patients randomized to nurse telephone support or usual care.	3 sites: conducted at Durham VA Medical Center	none specified	Durham, NC
38	Rose, Arenson, et al (2008)	Adapted to low-income urban African-Americans	non-random	A variety of community sites, including senior citizen centers, senior housing for people with lower incomes, and churches	Low-income urban African Americans	Philadelphia, PA
41	Smeulders, van Haastregt, et al (2009)	no stated modifications	Patient level randomization to intervention or control	Recruitment from 6 hospitals & 21 CDSMP classes	Congestive Heart Failure patients, able to write, and speak Dutch	Netherlands
42	Sobel, Lorig, & Hobbs (2002)	no stated modifications	RCT follow-up	not specified	Kaiser Permanent (KP) patients	Nine KP Regions



Article #	Citation	Fidelity to Stanford CDSMP	Randomization Notes	Site Information	Screening	Country/Region
43	Swerissen, Belfrage, et al (2006)	CDSMP modified by participants first language (Vietnamese, Chinese, Italian or Greek)	Participants randomized to intervention and waitlisted control groups	multiple sites in single state of Australia	People from Vietnamese, Chinese, Italian and Greek backgrounds suffering from chronic conditions. From low income areas.	Australia

## **Appendix D.**

### **Fidelity to Stanford CDSMP**

---

Article #	Citation	Fidelity to Stanford CDSMP	Program Modification
1	Ahmed & Villagra (2006)	No stated modifications	No stated modifications
3	Barlow, Turner, et al (2009)	CDSMP implemented by National Health Service (NHS) in the UK, with lay leaders	NHS runs the program. It is administered to multiple sclerosis (MS) patients only.
4	Barlow, Wright, et al (2005)	CDSMP implemented by NHS in the UK, with lay leaders	The NHS-run CDSMP programs have conformity in who runs the program, being run through Primary Care Trusts (PCTs) by two individuals with personal experience of a chronic condition. However, AoA-funded CDSMPs must demonstrate fidelity to the Stanford model, which requires only one lay leader and another leader of varying background. In practice, some AoA-funded CDSMPs have lay leaders and health professionals or other volunteers. Because both the delivery and content of the NHS-funded CDSMP was prescribed with limited flexibility, it created tension and difficulty in meeting the needs of local communities. (Rogers et al, 2006)
7	Bedell (2008)	Modified version of CDSMP for work transition & self-management skills for HIV/AIDS patients.	In this study, CDSMP was referenced, but this program is distinct from the CDSMP in that the former combines work transition skills and self-management skills for HIV/AIDS and the outcomes measured are quite different than those from CDSMP.
12	Ersek, Turner et al (2008)	Modified CDSMP program for PAIN	In this self-management program for PAIN, Lorig's works (CDSMP) were referenced, but this program is distinct from the CDSMP, e.g. outcomes measured.
14	Gitlin, Chernett, et al (2008)	Modified for urban older African Americans in Philadelphia, delivered by a senior center. named Harvest Health.	Concerned with health disparities for older African Americans in Philadelphia, the CDSMP was adjusted for delivery by a senior center and evaluated whether participants derived similar benefits to those reported in the original Lorig and colleagues (1999) trial with middle-class White patients. State modifications were: 1.) Name change to Harvest Health; 2.) Orientation session 1 wk before start of sessions; 3.) Use of culturally grounded language for key words; 4.) Change in reference to Black church in instructor's manual and replacement with reference to "spirituality"; 5.) Use of culturally appropriate music during aerobic phase of session; 6.) Serving of healthy snacks and emphasis on avoiding sweets and salt; 7.) Introduction of moment of silence at beginning of each session; 8.) Additional unit on communicating with health care provider of a different race, and 9.) Certificate of completion of program

Article #	Citation	Fidelity to Stanford CDSMP	Program Modification
15	Goeppinger, Armstrong et al (2007)	CDSMP & Arthritis Self-help Course (ASHC). Only one or the other was administered to a participant. They were modified for cultural acceptability.	Not stated modifications for CDSMP and the main differences for the ASMP is that it is 2 hours long, has "pain management, energy conservation, osteoporosis, sleep, and making nontraditional treatment decisions" as its content, while it does not have "Advanced directives, better breathing and communication" as its content.
17	Haas, Group, et al (2005)	No stated modifications	No stated modifications
19	Jerant, Moore-Hill et al (2009)	Used Homing in on Health (HioH), a CDSMP variant	The program used Homing in on Health (HioH), a CDSMP variant. a variant of the CDSMP delivered either in subjects' homes or by telephone, it was found that delivering the intervention in participants' homes (but not via telephone)
21	Kendall, Catalano, et al (2007)	Modified CDSMP for recent stroke patients	The program was the Australian CDSMP. Similar to NHS-funding CDSMPs, Australian courses use a highly structured course protocol, but instead of lay leaders, use trained health professionals (Kendall et al, 2007). On a national level, the Australian Commonwealth Department of Health and Ageing implemented the Sharing Health Care Initiative, which involved several large demonstration projects across a variety of settings (Commonwealth Government Department, 2005).
22	Kennedy, Reeves, et al (2007)	CDSMP implemented by NHS, with lay leaders	This program was an anglicized version of the Stanford CDSMP.
24	Lorig, Ritter et al (2001)	No stated modifications	No stated modifications
25	Lorig, Ritter, et al (2008)	Online version of EPP (Expert Patients Programme), based on the CDSMP	The NHS-run CDSMP programs have conformity in who runs the program, being run through Primary Care Trusts (PCTs) by two individuals with personal experience of a chronic condition. However, AoA-funded CDSMPs must demonstrate fidelity to the Stanford model, which requires only one lay leader and another leader of varying background. In practice, some AoA-funded CDSMPs have lay leaders and health professionals or other volunteers. Because both the delivery and content of the NHS-funded CDSMP was prescribed with limited flexibility, it created tension and difficulty in meeting the needs of local communities. (Rogers et al, 2006)
26	Lorig, Ritter, Gonzalez, et al (2003)	Spanish-language version called Tomando Control de Su Salud: not direct translation, cultural modifications	This program was a Spanish-language version called Tornado Control de Su Salud. This program was not a direct translation, some cultural modifications were made.

Article #	Citation	Fidelity to Stanford CDSMP	Program Modification
27	Lorig, Ritter, Jacquez, et al (2005)	Spanish-language version called Tomando Control de Su Salud: not direct translation, cultural modifications	This program was a Spanish-language version called Tornado Control de Su Salud: not direct translation, cultural modifications
28	Lorig, Ritter, Laurent, et al (2006)	Online version of CDSMP	This program was an online version of CDSMP. No details on modification were specified.
29	Lorig, Ritter, Plant, et al (2005)	Compared Arthritis Self-Management Program (ASMP) & generic CDSMP.	This study compared the Arthritis Self-Management Program (ASMP) and the generic Chronic Disease Self-Management Program (CDSMP). The main differences between the programs are: ASMP (CDSMP) is 2 (2.5) hr long, has "pain management, energy conservation, osteoporosis, sleep, and making nontraditional treatment decisions" as its content, while it does not have "Advanced directives, better breathing and communication" as its content.
30	Lorig, Sobel, Stewart, et al (1999)	No stated modifications	No stated modifications
31	Lorig, Sobel, Ritter, et al (2001)	No stated modifications	No stated modifications
32	Nolte, Elsworth, et al (2007)	Fidelity to CDSMP not specifically mentioned.	Unknown
34	Powers, Olsen, et al (2009)	Modified CDSMP program delivered by nurses via phone	For this program, nurses, as opposed to laypeople, delivered the intervention by phone. There was no face-to-face meetings between the nurse and the patient.
38	Rose, Arenson, et al (2008)	Adapted to low-income urban African-Americans	This program was adapted to low-income urban African-Americans.
41	Smeulders, van Haastregt, et al (2009)	No stated modifications	No stated modifications
42	Sobel, Lorig, & Hobbs (2002)	No stated modifications	No stated modifications
43	Swerissen, Belfrage, et al (2006)	CDSMP modified by participants first language (Vietnamese, Chinese, Italian, or Greek)	This study evaluated the original CDSMP in the context of "real-world" clinical practice.